December 15, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 53

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DETROIT

definite savings in 1948

TO OWNERS OF ELECTRODE SALT BATH FURNACES

New HOLDEN electrode principle saves 15 to 35 percent in power and electrode costs.

Conversion. *Any make of electrode furnace* can be converted to this method of heating by installing our new furnace assembly.

Your investment will pay for itself in power savings and lower electrode costs in six to twelve months depending on operating temperatures.

Additional savings —Salt bath losses are reduced from 10 to 25 percent by curtailing radiation dissipation and the elimination of sludge in the bottom of the furnace pot.

GUARANTEE

TEMPERATURE	FURNACE	POWER CONDUCTOR
1000 to 2000°F	2 years	2 years
2000 to 2300°F	1½ years	1 year

FREE ENGINEERING SERVICE

Let us inspect your present electrode furnace and quote on conversion.

You can do it *BETTER*
in HOLDEN SALT BATHS and FURNACES
Holden Research provides proof before purchase

BULLETIN S-601 — Free on request.

THE A. F. HOLDEN COMPANY • *Metallurgical Engineers*
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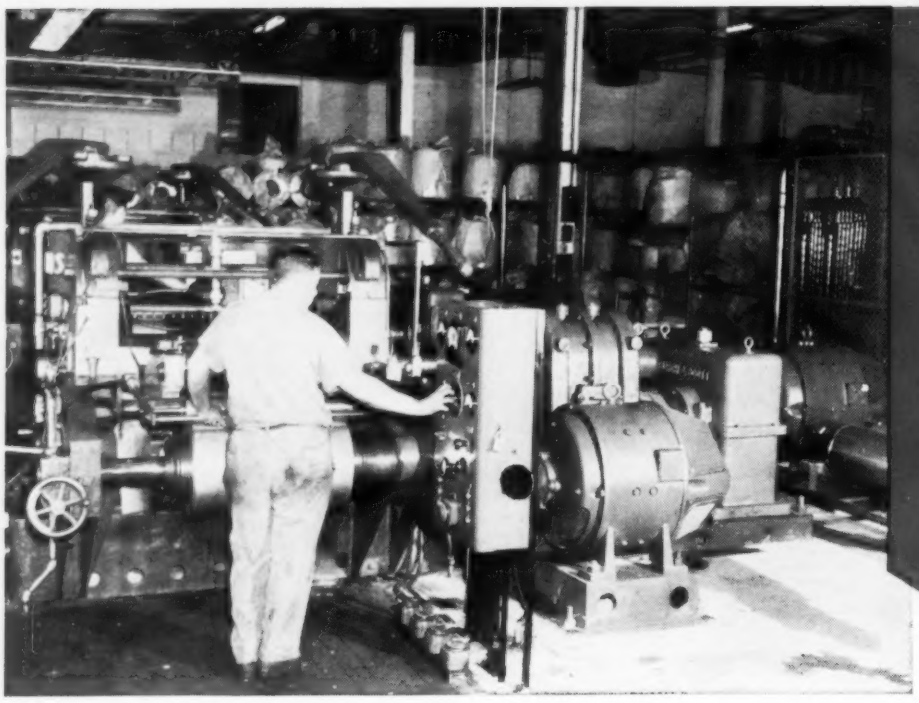
FOREIGN MANUFACTURERS • Canada: Peacock Brothers, Ltd., Montreal • France: Fours Electriques Ripoche, Paris • Belgium: Le Four Industriel Belge, Antwerp, and other principal countries

ADJUSTABLE SPEEDS

...FROM A-c. CIRCUITS



Plus

QUICK, SMOOTH STARTS & STOPS

•

CONTROLLED ACCELERATION

•

MAINTENANCE OF PROPER TENSION

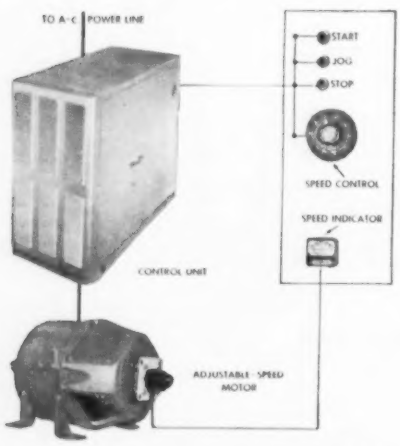
•

ALL ELECTRIC CONTROL

with

RELIANCE V★S DRIVE

RELIANCE V★S DRIVE



Conveniently-packaged, space-saving V★S Drives are available from 1 to 200 hp. Two or more motors may be operated simultaneously from a single Control Unit.

The amazing adaptability of Reliance V★S—*the All-electric, Adjustable-speed Drive which operates from A-c. Circuits*—permits its successful employment on practically any production machine or process. Operation of a V★S-equipped machine is simple and easily learned. Control is all-electric, manually or automatically directed, right at the machine or from remote stations. We have yet to find a plant or process where, at some stage of operation, V★S cannot increase or improve production and lower costs. Let us prove this in your plant. Contact the Reliance engineer in your locality or write for Bulletin 311 which will give you some further information about Reliance V★S Drive.

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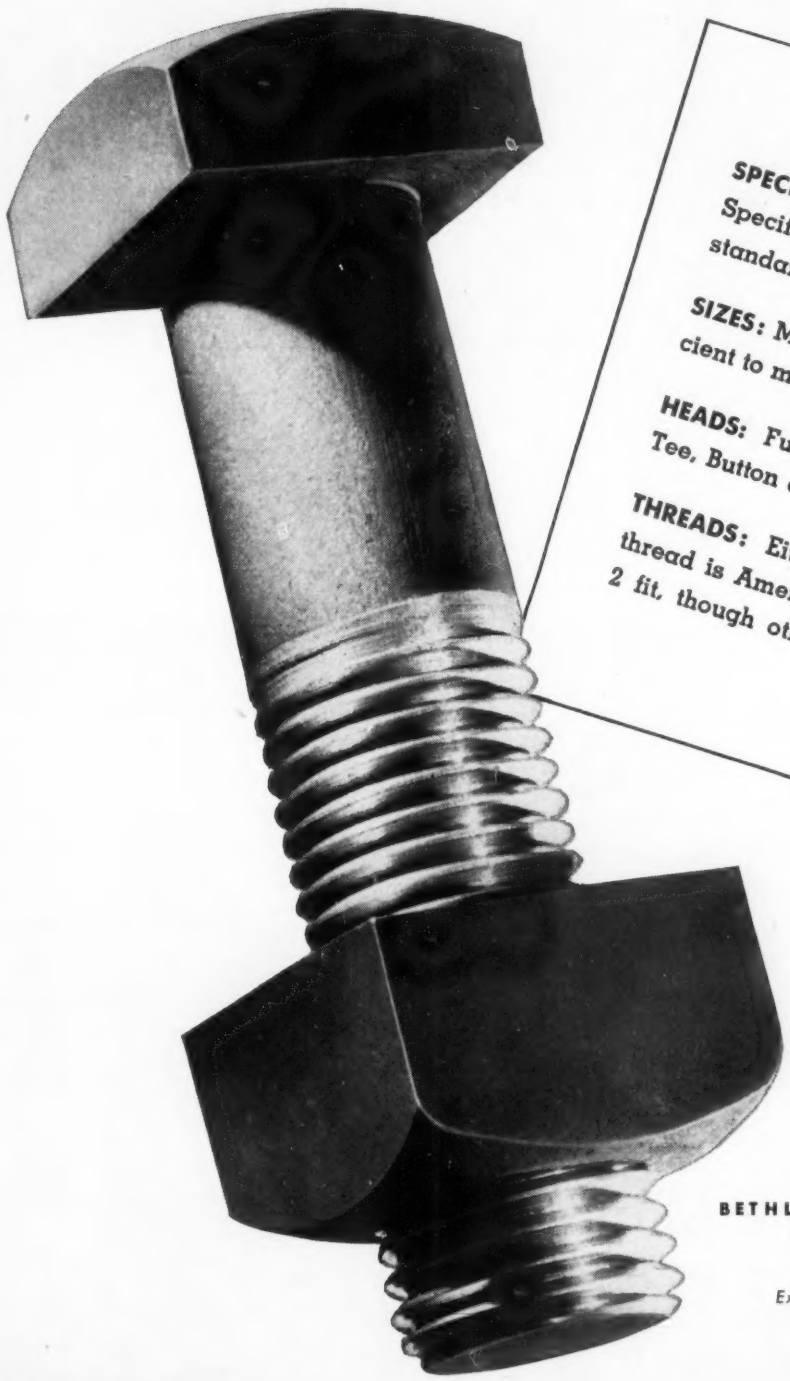
RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

Machine Bolts



SPECIFICATIONS: Usually made to ASTM Specification A-7. Also furnished in many standard grades of carbon or alloy steel.

SIZES: Made in a wide range of sizes, sufficient to meet practically every need.

HEADS: Furnished with Square, Hexagon, Tee, Button and Countersunk Heads.

THREADS: Either cut or rolled. Standard thread is American Standard Coarse, Class 2 fit, though other types can be furnished.

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BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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Bethlehem supplies every type of Fastening

ORTON

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Proved through the years the smoothest-operating, fastest light "on track" machine built.

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- **ANTI-FRICTION BEARINGS**

1 ANTI-FRICTION BEARINGS THROUGHOUT.

2 AIR-OPERATED CONTROLS THROUGHOUT.

3 INDEPENDENT TRANSMISSION, WITH BUILT-IN REVERSE, ALLOWS LOWERING AGAINST COMPRESSION.

4 COMPLETELY AUTOMATIC SPRING-APPLIED, AIR-RELEASED BOOM-HOIST BRAKE. POSITIVELY PREVENTS DROPPING OF BOOM.

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6 SINGLE-POINT ADJUSTMENT V-TYPE ORCOIN BLOCK CLUTCHES, WHICH CANNOT GET OUT OF ROUND.

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...all job-proved...assure you the correct rope for your equipment

When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte consulting engineers will check your equipment and recommend the wire rope specifically engineered for your job. Ask your Macwhyte distributor, or write Macwhyte Company.

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Behind the Scenes...

Even the Smallest

Probably not one of you readers in a hundred noticed it last week, but the price of platinum went up $4 per ounce and same fact was recorded in our price pages. To most of our readers, the price pages are just solid pages of figures, which can be very useful when a particular commodity has to be checked. However, to the editors who have to check the thousands of prices quoted every week in those seven pages which lead off the market section they represent a tremendous amount of effort, a lot of personal calls and phone calls, and they require constant vigilance. There aren't too many people in the metalworking industry interested in the price of indium, palladium or iridium, or any of a couple of dozen like items. However, when the problem comes up, the price quoted in STEEL has to be right—which means that each one of those thousands of numbers has to be watched with an eagle eye every time an issue goes to press. That's part of the service our market staff renders, and you can take the word of a lot of purchasing agents who have been assisted by the information we publish that it's a good job.

Do You Eat What You Are?

We just heard about the industrial leader who at a recent lunch was heard to make a very positive statement that he could analyze the personality of anyone by watching the food they were eating. Whereupon six of his employees at the next table cancelled their orders for shrimp!

Noses Will Be Counted

The grand-daddy of all industrial market studies, the Census of Manufactures, is already under way down in Washington. Shortly after the first of the year forms will be mailed to some 250,000 plants throughout the country on which will be reported the many factors having to do with business as she was done in 1946. We will here and now add our small voice to the appeal of the government for co-operation in filling out these forms, which will give industry its first official yardstick in eight years, since the 1939 census was published back in 1940. Things, we might add, are much different now. Although we have been conducting our own private census of the metalworking industry since 1939, and we know some of the things which have happened since that last census, we're probably going to be much surprised ourselves when the big job is done. It will be a big help to Messrs. Conklin, Gretton, Mautz and all the others at the Census Bureau who are undertaking the job if all you good folks will get those forms back just as soon as your own figures are complete for the year.

Things Are Tough There

We noted with a small chuckle the report on the annual meeting of the Austin Motor Co., held recently in Birmingham, England. The atmosphere must have been one of gloom, what with the extreme pinch of the austerity program and the prohibition of driving for any but the most essential of purposes. Production of cars had been running at about 2000 per week, far below capacity, and material shortages as well as the labor shortage precluded all attempts to raise output. After running through some 25 paragraphs on the outlook, conditions in the market, the financial position of the company and its trying problems, the report wound up as follows: "The report and accounts were unanimously adopted and dividends of 20% on the Preferred Ordinary stock and 40% on the Ordinary and 'A' Ordinary stock were approved." Wonder what the company might do in good times?

Three New Ones

This week you'll see what we've been talking about. First page of our news section—news summary. First page of our engineering section—engineering summary. First page of our market section—market summary. All three of these special jobs are designed to be interesting timesavers, built at the request of a lot of you readers. All we need to say now is that, well, you asked for it, and we've provided it. We'd like very much to have you tell us what you think of these three pages. Why not drop us a line? Good or bad, we can take it!

Shrdlu

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STEEL

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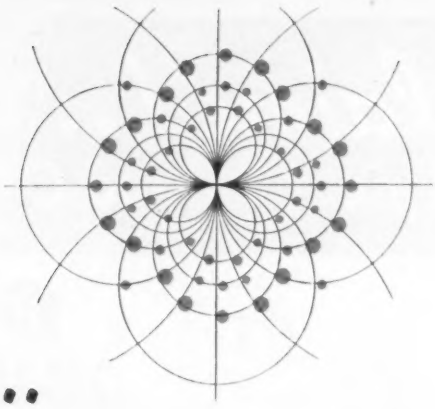
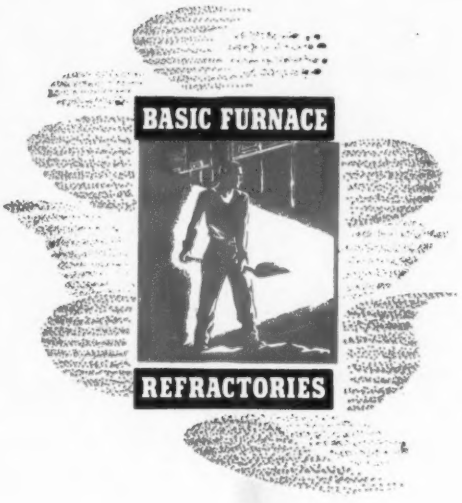
Editorial Staff on Contents Page

ABC ABP



It isn't the magnesia...

..IT'S THE PERICLASE

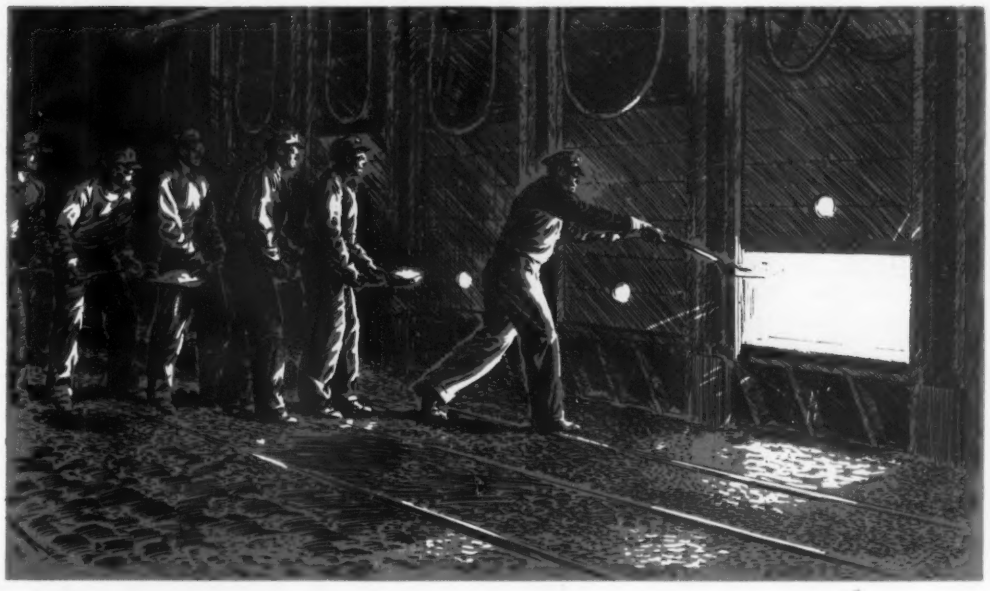


MAGNESIA has long been considered as the most valuable component of a hearth refractory. Actually it is not magnesia by chemical analysis, but periclase, the crystalline form of magnesia, which provides the high resistance to erosion that steelmakers require.

Conventional grain magnesites have a high magnesia content, but require the addition of large amounts of open hearth slag to permit sintering. Installation is slow, laborious and expensive. Periclase content of the completed hearth is diluted by the large, unevenly distributed slag additions.

Basifrit, the original "quick setting" magnesite, eliminates these deficiencies. Its composition includes a refractory calcium silicate bond and a coalescing agent, calcium ferrite. Calcium silicate is compatible with the usual lime-rich slags encountered in the basic steelmaking process, and calcium ferrite, formed in Basifrit during manufacture, permits the refractory to set rapidly at normal furnace operating temperatures.

As a result of these designed properties, a Basifrit hearth takes but half the time required to install a conventional magnesite-and-slag hearth. All the magnesia in Basifrit is in the form of periclase, the key factor responsible for the excellent performance of Basifrit hearths, scores of which are still in use after 15 to 20 years of service.

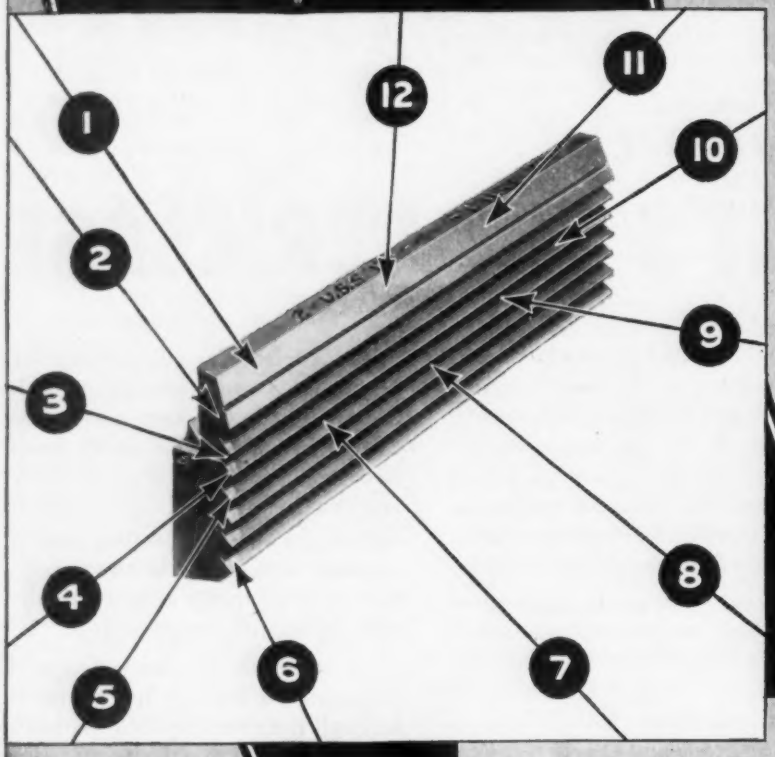


Basic Refractories Incorporated 845 HANNA BUILDING, CLEVELAND 15, OHIO

Exclusive Agents in Canada: REFRACTORIES ENGINEERING AND SUPPLIES, LTD., Hamilton and Montreal

Acclaimed..

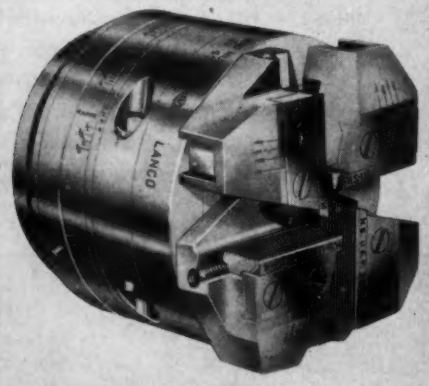
The Finest Thread Cutting Tool in Industry



The LANDIS CHASER

Used Exclusively in LANDIS Die Heads and Threading Machines

LANDIS



1-Permanent throat permits close to shoulder threading throughout life of chasers

2-Rake angle range covers all machinable materials

3-Free cutting condition permits maximum cutting speeds

4-Simple grinding operation renews entire cutting edge and leading feature

5-Line contact with work lessens friction and minimizes thread distortion

6-Leading feature insures thread of accurate lead

7-Lateral absorption of cutting strain reduces vibration and chaser breakage

8-Right and lefthand threading feature reduces chaser equipment

9-Standard chasers thread all diameters with proper chaser holders

10-Interchangeability of chasers lowers operating cost

11-Chaser length provides exceptionally long life and low tool cost

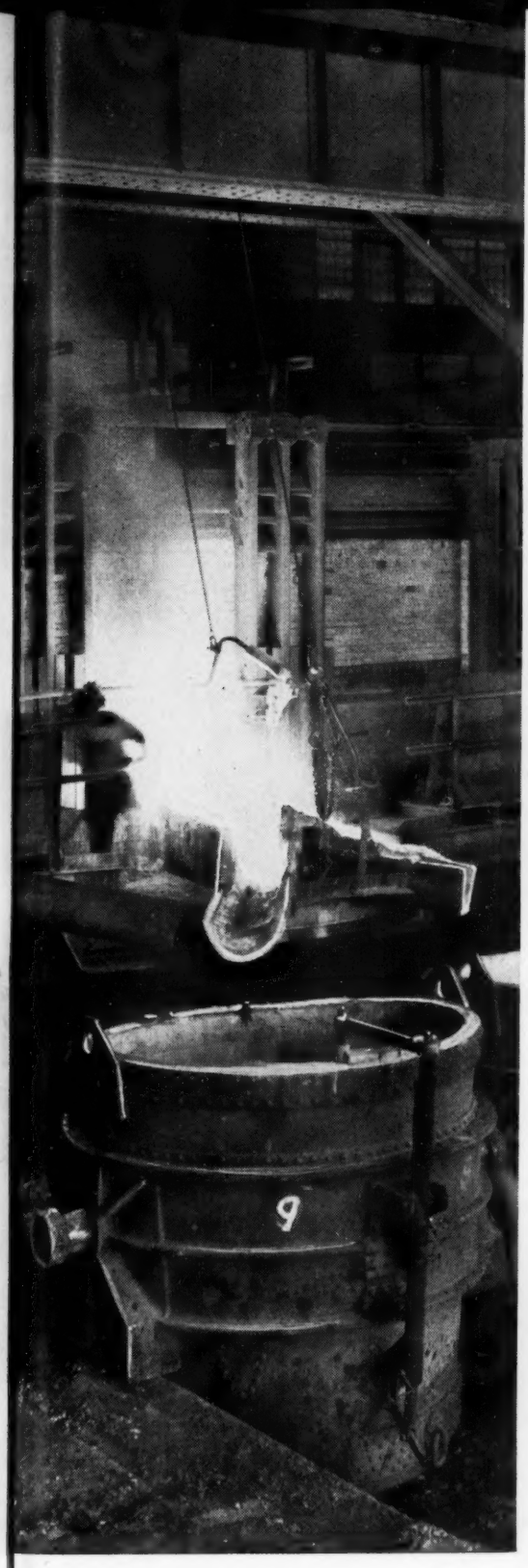
12-Permanent throat gives equal distribution of cut

The life of the Landis Chaser, due to its design which makes it possible to machine the thread form along the entire length of the chaser, is from ten to twenty times that of the hobbed type die.

The cutting edge is renewed completely at each regrinding thereby maintaining the original accuracy of the chaser. The throat is not altered by regrinding and therefore permits close-to-shoulder threading throughout the life of the chaser.

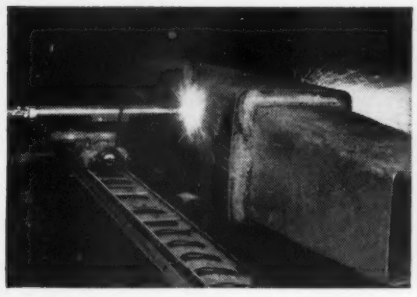
Landis Chasers are interchangeable—any one of a set may be replaced.

LANDIS MACHINE CO. Waynesboro, Pa.

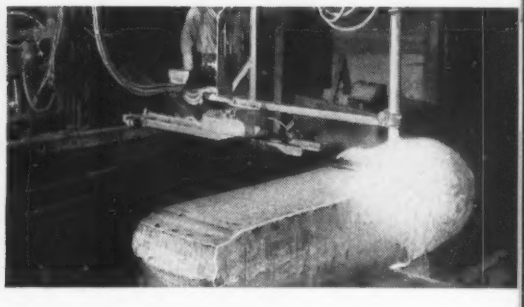


At the blast furnaces and open hearths, oxygen plays an important part. Furnace-tapping with the oxygen lance—oldest use of oxygen-cutting in steel plants—still saves time and reduces hazards.

Help on the Hot and Heavy Jobs



Ingots requiring 200 hours for mechanical "parting" have been split with the OXWELD C-45 heavy-duty blowpipe and then machined in 14 hours total time.



Cutting the hot top off this 26-inch forged slab with the C-45 blowpipe took less than 10 minutes and left the slab end square and undeformed.

The deseaming blowpipe, equipped with the OXWELD starting-rod feed, has reduced conditioning costs more than 50 per cent.

Draining furnace salamanders by oxygen-lance tapping has reduced furnace down-time more than three weeks in some steel plants.

LINDE service engineers who co-operate closely with the steel industry—have combined experience, knowledge, and practical "know-how" to help make better steel, faster, and at lower cost.

LINDE engineering service is always available to LINDE customers through the nearest LINDE office.

Linde

The words "Linde" and "Oxweld" are registered trade-marks of Units of Union Carbide and Carbon Corporation.

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Unit of Union Carbide and Carbon Corporation

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The Home of Quality Steel for Middle America

Hundreds of manufacturers recognize the advantage of Granite City's central location in the heart of Middle America. But more than this, they recognize the fine quality of Granite City Steel.

Since 1878, Granite City Steel Company has constantly expanded its facilities to permit the use of the most modern production methods. Yet it has always remained small enough to permit the scrupulous attention to manufacturing detail that results in finer steel.

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SINCE GRANITE CITY STEEL 1878

STRIPLATES
ELECTRICAL SHEETS
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TIN PLATE

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"TRULY LIFE-TIME MOTORS"

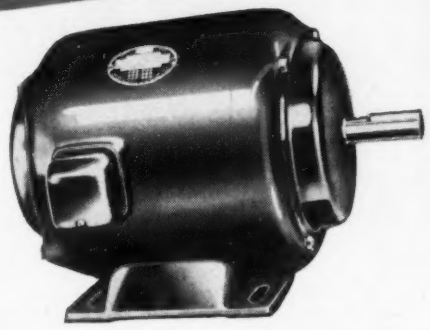
B-LINE

New "Lo-Flite" Motor

PATS. PEND.

FLAT AS A PANCAKE

½ H.P. 1/3, ½, ¾, 1, H.P.



In addition to B-LINE Standard Motors from 1/6 to 30 H.P. there are many B-LINE Motors designed for Special Applications, such as the "Pancake" motor, developed far Scrubbing, Waxing and other floor machines. If you use Standard or Special motors of any type your inquiry is invited... Our Engineering Department will be glad to cooperate with you.

"If it's a B-LINE Motor it's Guaranteed"

B-LINE MOTORS
1/6 to 30 HP

B-LINE GEARMOTORS
All Standard and Special Ratios

TOOLMASTER
Electric Grinders
Pedestal & Bench

Wire or write for Bulletin

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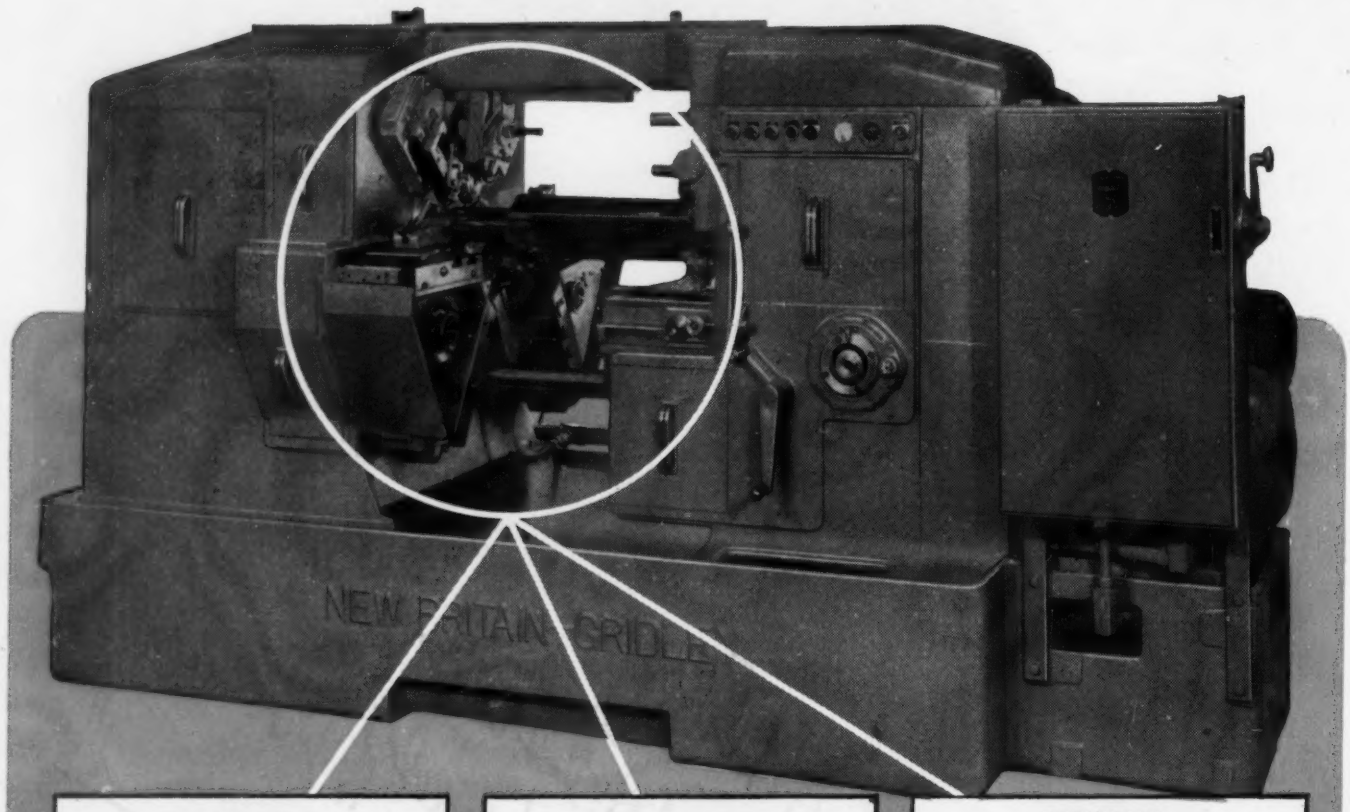
NEW BRITAIN'S NEW LINE OF SCREW MACHINES

Answers the Need for Lower Costs and Higher Productivity



QUICK SET UP

1. No cam to change for main tool slide. Strong, positive universal cam selects feed stroke without changing high point, stops or total stroke.
2. No cam to change when adjusting stock feed-out length.
3. Cross slide cams directly behind slides minimizing linkage. Remove three screws with cover and cams pull off.
4. Micrometer adjustment in both directions on all cross slides, all independent of stops.

SYMMETRICAL RADIAL TOOLING

1. Five heavy-duty forming slides and cut off slide evenly spaced about carrier making line of forming thrust identical in each position.
2. Tool holders interchangeable among forming slides, also on main tool slide.
3. Greatly increased chip clearance and capacity so essential with carbides.
4. Flexibility for auxiliary threading attachments. Accelerating drives in every position.

FOOLPROOF, AUTOMATIC OPERATION

1. Shoulder height, complete control panels at front and rear of machine.
2. Automatic stop shuts off machine and flashes red light when spindle is empty.
3. Program wheel on outside of powercase shows complete cycle of machine.
4. Machine stops if lubricating oil pressure is low.
5. Gage indicates when machine is operating at other than normal load.

Fast, powerful machines which will outperform anything modern tools will handle and anticipate future tool developments. These new machines with their initial and permanent accuracy also incorporate all the previous exclusive features by which NEW BRITAINS are recognized. To these qualities have been added new features, making it possible to accomplish quick setups where short runs are the rule. Built massive to handle the horsepower required for steady feeds for carbides on tough forming steel jobs, they are also designed for super high-spindle speeds, essential for brass and aluminum. Six spindles up to 2¼" capacity.

THE NEW BRITAIN MACHINE CO.

NB

NEW BRITAIN

Automatics

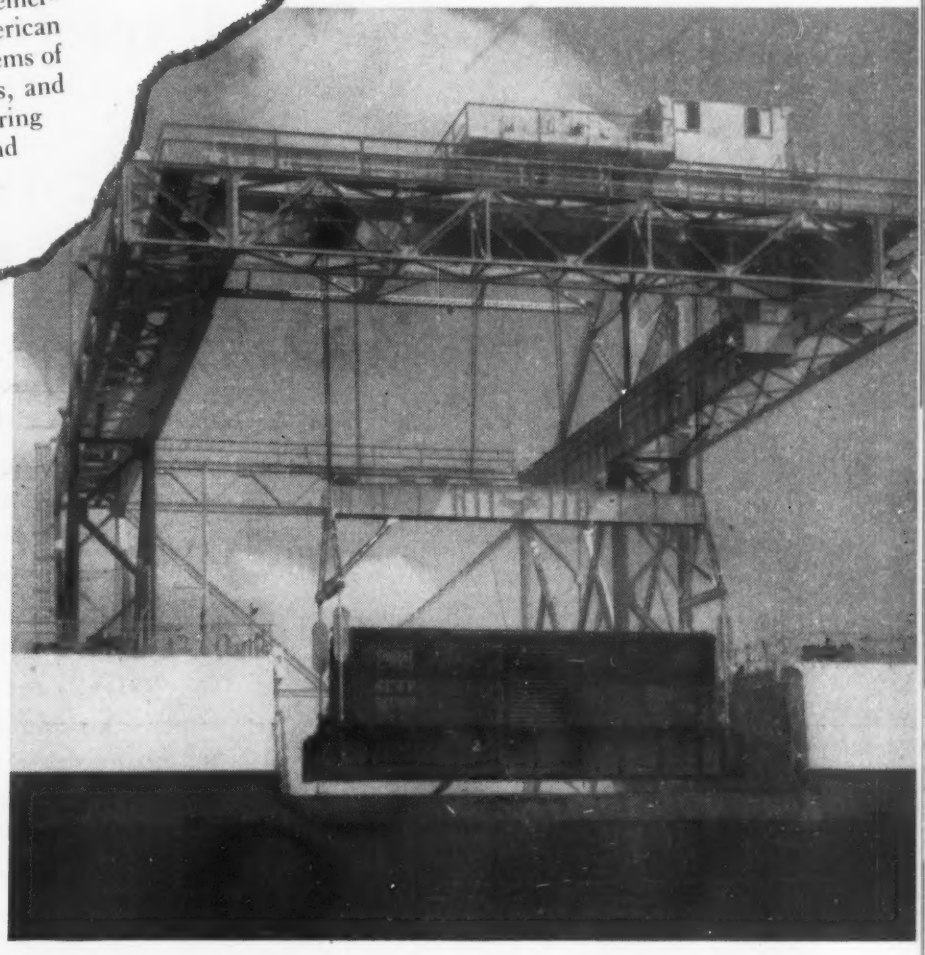
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN-GRIDLEY MACHINE DIVISION
NEW BRITAIN, CONNECTICUT

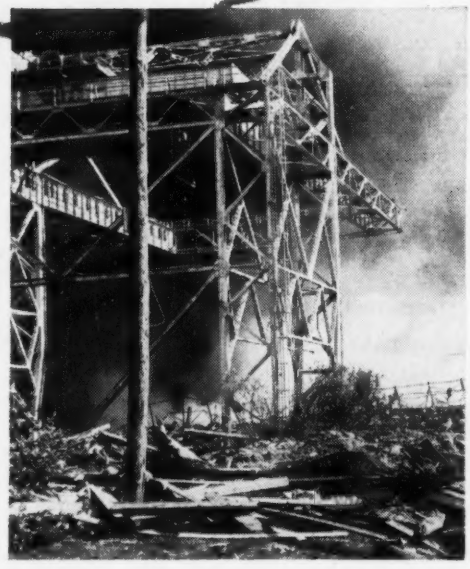
M-01062

Crane Repaired in Record Time after Texas City Blast

On April 16, 1947, the French freighter *Grandcamp* exploded within 100 yards of this crane, subjecting it to the full force of the blast. Built by American Bridge Co. for Seatrain Lines, Inc., in 1940, its job was to lift loaded freight cars on and off the Seatrain ships which docked there.

THESE pictures and captions describe an emergency job. But it's a job that typifies American Bridge service. Why not put your own problems of structural fabrication and erection up to us, and take full advantage of our wide engineering experience, technically trained personnel and unequalled production facilities? Just contact our nearest Contracting Office.





Fires still smouldered when American Bridge engineers arrived at the scene to evaluate the extent of the damage and arrange for necessary repairs. American Bridge Co. undertook the entire job, including structural steel, electrical and foundation work.

By August 1, 1947, the crane was again in operation. Re-erected and tested to carry an overload of 25%, it takes these loaded freight cars in stride. Both this crane in Texas City and a larger crane of Seatrain Lines at Edgewater, N. J., are hardworking examples of the familiar phrase: "Fabricated and erected by American Bridge."

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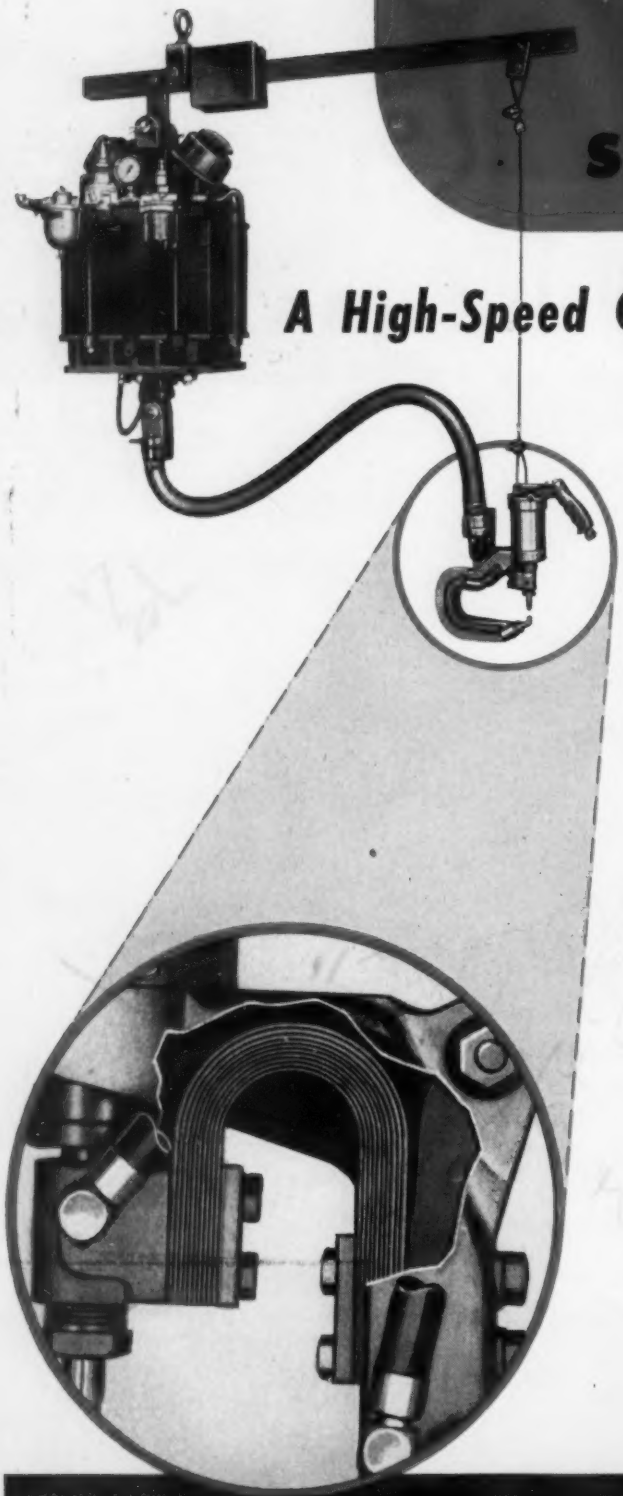
UNITED STATES STEEL

•MARTIN•

AIR or HYDRAULIC SPOT WELDING GUNS



A High-Speed Cost-Cutting Production Tool Designed for Flexibility, Lightness and Durability, and Featuring . . . . . the

Non-Kick ROLLING SHUNT

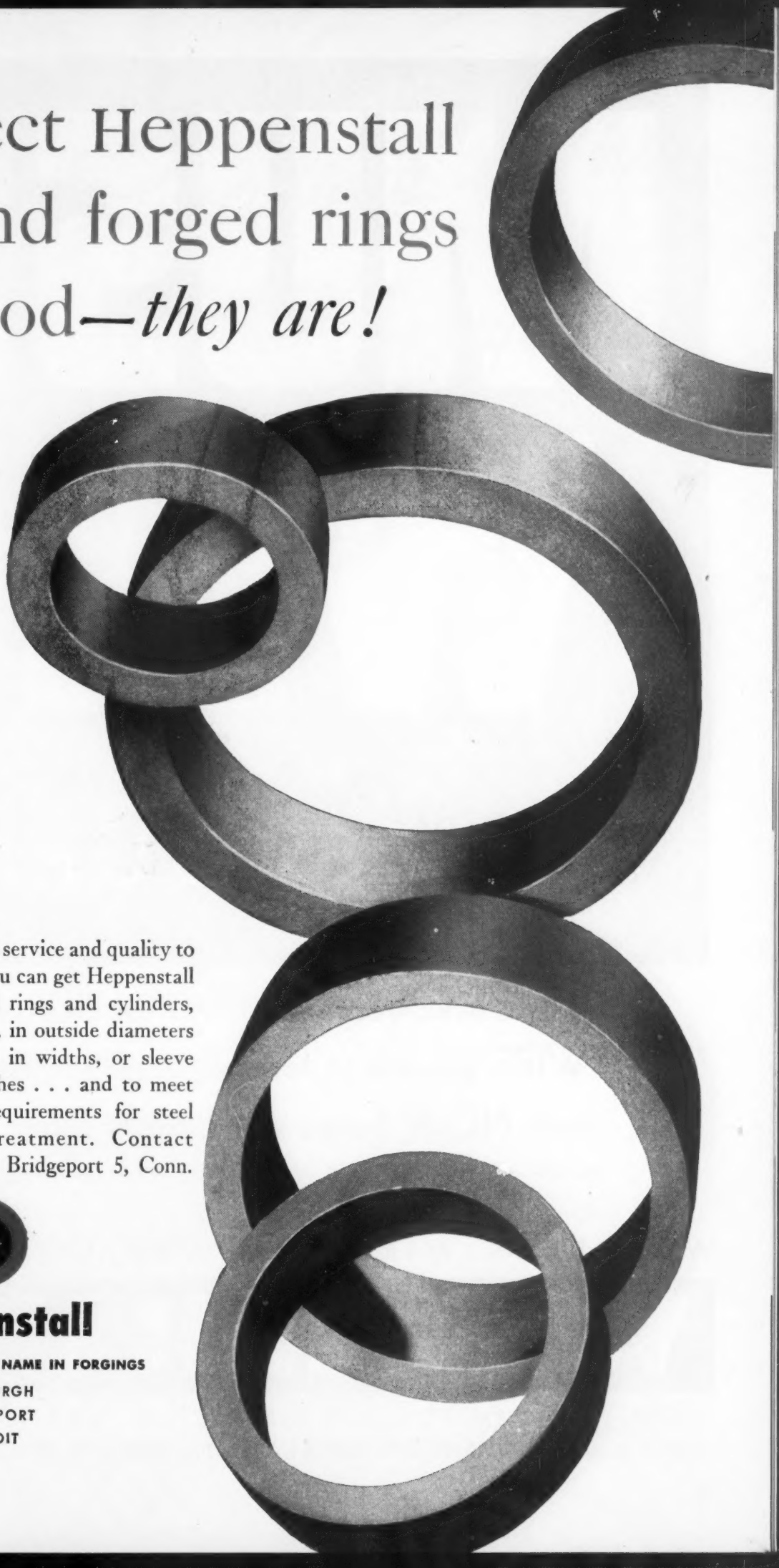
Martin Spot Welding Guns cut costs and speed up work progress on jobs too bulky or otherwise unsuitable for special welding fixtures and welding machines. They're adaptable, through custom-built yokes and adaptors, to the full range of job shop work. Typical of Martin superiority is the exclusive Rolling Shunt (see cutaway section at left). This production-tested design eliminates cable "kick," reduces operator fatigue, gets more work done because it works *with* the welder, not against him. Write for literature and the name of your nearest Martin representative.

MARTIN ELECTRIC COMPANY

3040 E. OUTER DRIVE • DETROIT 12, MICHIGAN

Manufacturers of Portable Spot Welding Guns • Transformers • Special Automatic Welding Machines and Standard Pedestal Type Welders

You expect Heppenstall rolled and forged rings to be good—*they are!*



You expect Heppenstall service and quality to be right—naturally. You can get Heppenstall rolled and forged steel rings and cylinders, black or rough finished, in outside diameters of 6 to 50 inches . . . in widths, or sleeve lengths, of 1 to 24 inches . . . and to meet your most exacting requirements for steel analysis and heat treatment. Contact Heppenstall Company, Bridgeport 5, Conn.

Heppenstall

THE MOST DEPENDABLE NAME IN FORGINGS

PITTSBURGH
BRIDGEPORT
DETROIT

MUSIC WIRE

BY

WASHBURN

If you have never tried WASHBURN MUSIC WIRE you are in for a pleasant surprise. Make tests NOW for your present or future product.

Write us the details of YOUR problem

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

12 Reasons Why

HY-TEST Safety Shoes

ARE FIRST CHOICE OF AMERICA'S LEADING SAFETY DIRECTORS

1 SOFT DURABLE QUALITY UPPER LEATHERS
2 SAFE-EZE BACK ONE-PIECE QUARTER NO RIPPING OR BINDING
3 ONE-PIECE SOLE LEATHER COUNTERS LEATHER COUNTER POCKETS
4 STEEL SHANK FOR GREATER SUPPORT AT ARCH
5 7-IRON FULL-GEMMED OAK LEATHER INSOLE
6 SOLES OF THE FINEST QUALITY MATERIALS
7 AUSTEMPERED ANCHOR FLANGE STEEL BOX TOE
8 REGULAR SHOE LAST
9 TOUGH BOX TOE LINER PROTECTS VAMP LINING
10 SHOCK ABSORBING FELT DOUBLER
11 SLANT-EZE TOP FOR LACING COMFORT

12

FULL RANGE OF SIZES, TYPES AND STYLES FOR EVERY SAFETY NEED

...Insure Workers Feet In Sure Protection

50 DIFFERENT TYPES

9 DIFFERENT KINDS OF SOLES

WIDTHS AA-EEE, SIZES 5-15

5 LASTS (Dress & Work)

WELT AND NAILED CONSTRUCTION

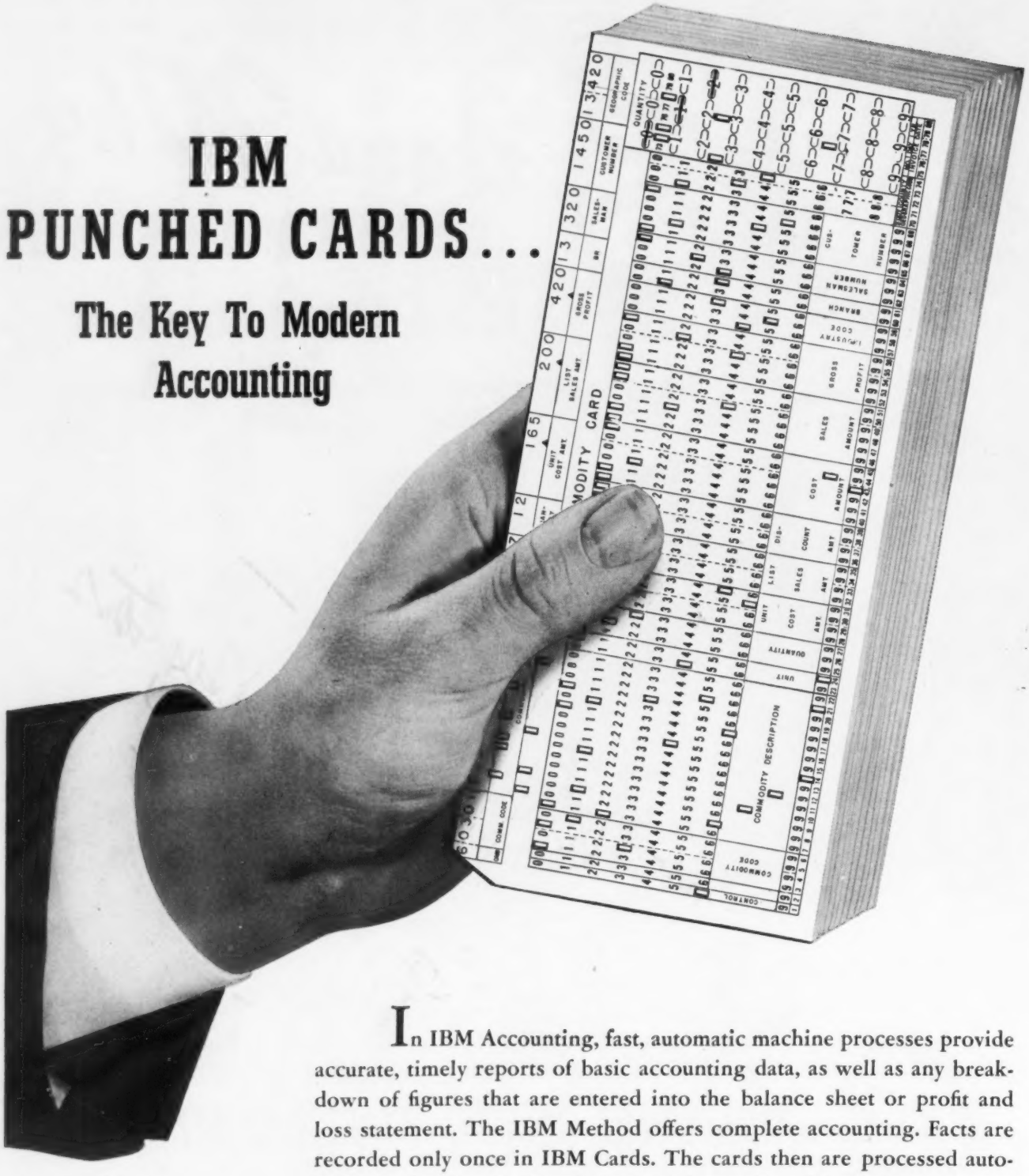
HY-TEST Safety Shoes

HY-TEST SAFETY SHOES

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MISSOURI • EASTERN OFFICE • MANCHESTER, N. H.

IBM PUNCHED CARDS...

The Key To Modern Accounting



In IBM Accounting, fast, automatic machine processes provide accurate, timely reports of basic accounting data, as well as any breakdown of figures that are entered into the balance sheet or profit and loss statement. The IBM Method offers complete accounting. Facts are recorded only once in IBM Cards. The cards then are processed automatically by Electric Punched Card Accounting Machines to prepare various accounting reports to meet individual requirements.

An IBM installation in your office, or an IBM Service Bureau, can handle any type of accounting routine. IBM Service Bureaus, manned by skilled personnel, are located conveniently in principal cities.

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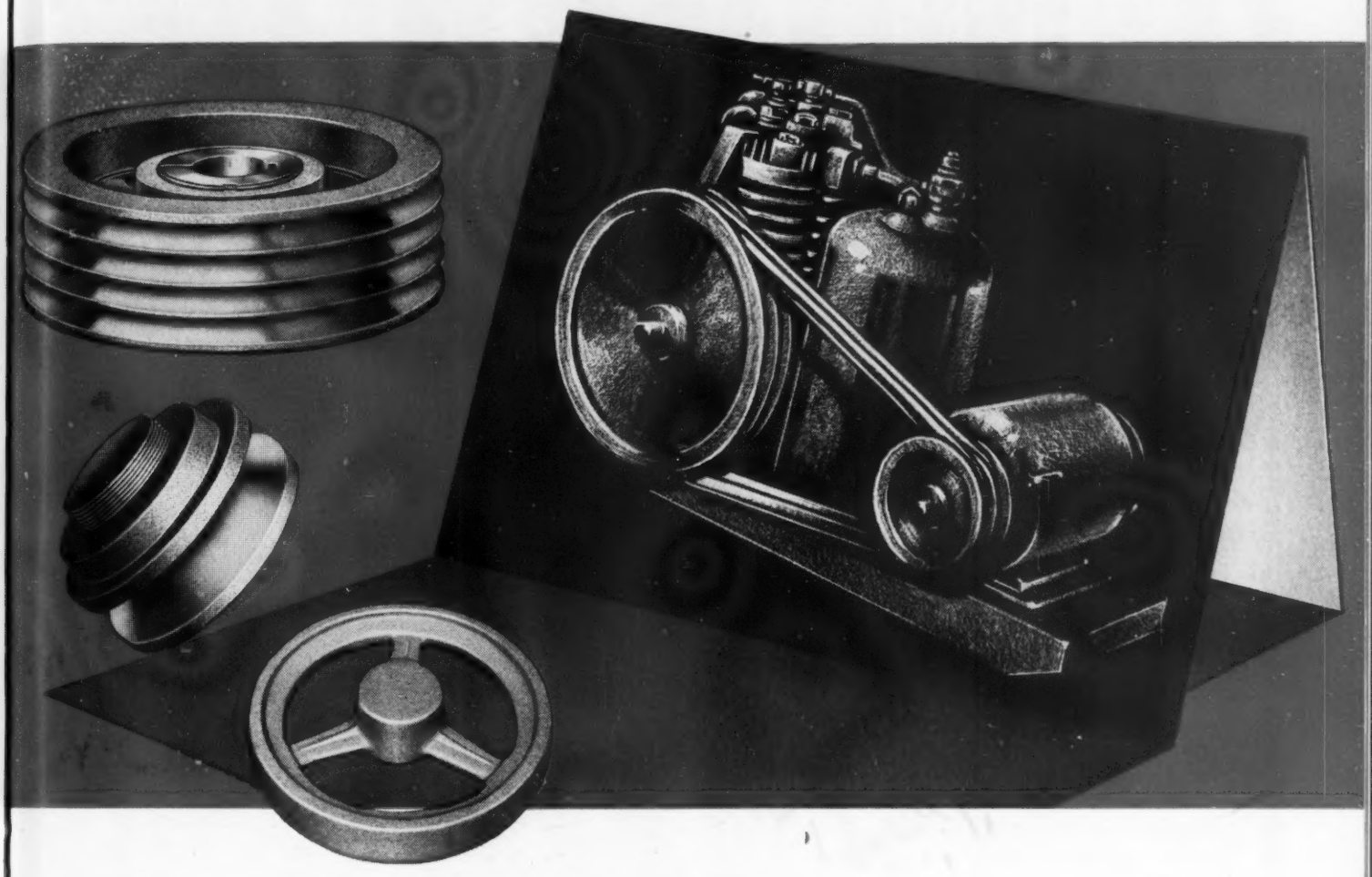
EATON

PERMANENT MOLD GRAY IRON CASTINGS



Make Better Vee-Belt Pulleys and Sheaves

A dense non-porous structure which is uniform throughout the casting, good tensile strength, and ability to take a high surface finish make Eaton Permanent Mold Gray Iron Castings ideal for the production of vee-belt pulleys, sheaves, and similar parts in a wide range of industries. Freedom from segregation, growth, and distortion is equally desirable. Free machinability makes for maximum production speed and low machining cost with a high percentage of perfect parts.

Eaton Foundry Division engineers will be glad to discuss the application of Eaton Permanent Mold Gray Iron Castings to your product.

Send for your copy of the illustrated booklet, *"A Quick Picture of the Eaton Permanent Mold Process for producing Gray Iron Castings."*

THE EATON PERMANENT MOLD MACHINE IS A SYMBOL OF THE QUALITY OF GRAY IRON CASTINGS PRODUCED BY THE PERMANENT MOLD PROCESS.

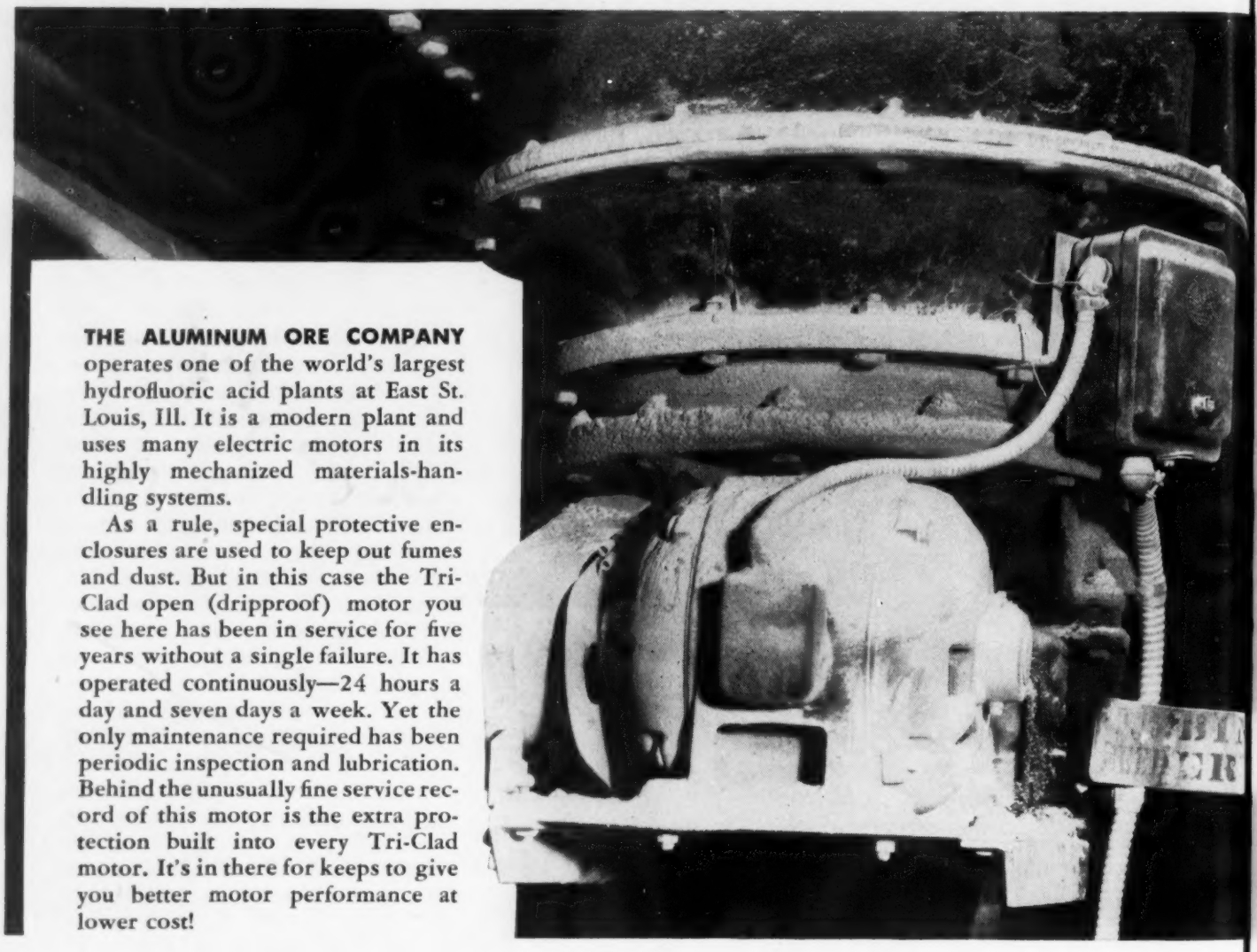
EATON

MANUFACTURING COMPANY

FOUNDRY DIVISION

9771 French Road Detroit 13, Michigan

4 MILLION HP



THE ALUMINUM ORE COMPANY operates one of the world's largest hydrofluoric acid plants at East St. Louis, Ill. It is a modern plant and uses many electric motors in its highly mechanized materials-handling systems.

As a rule, special protective enclosures are used to keep out fumes and dust. But in this case the Tri-Clad open (dripproof) motor you see here has been in service for five years without a single failure. It has operated continuously—24 hours a day and seven days a week. Yet the only maintenance required has been periodic inspection and lubrication. Behind the unusually fine service record of this motor is the extra protection built into every Tri-Clad motor. It's in there for keeps to give you better motor performance at lower cost!

The toughest TRI-CLAD ever built!

Newest addition to the Tri-Clad motor family is the Tri-Clad totally enclosed, fan-cooled motor. It is designed for use in adverse atmospheres—in iron dust, out-of-doors, in hazardous areas, and chemical atmospheres. Available in both standard and explosion-proof types, this motor gives you these important construction features:

- A cast-iron, double-wall frame which completely encloses and protects the windings and punchings.
- A non-shrinking compound around motor leads which protects motor interior from dust and moisture.
- A rotating labyrinth seal which further protects the motor interior from damage by foreign matter.

CONFIRMS IT!

FOR TOUGH MOTOR JOBS, YOU CAN'T BEAT

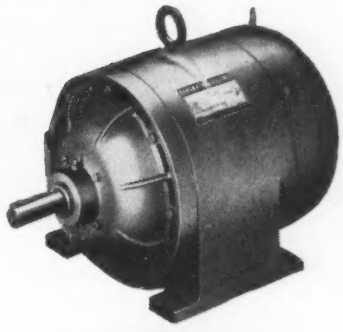
TRI-CLAD

EXTRA PROTECTION

To date, a million and a half Tri-Clad motors, with a total output of over 4-million horsepower, have been purchased by American industry!

In every kind of plant from steel mill to dairy, these motors are proof beyond doubt that you can't beat Tri-Clad extra protection for tough motor applications. Even on jobs where special protective enclosures would ordinarily have been specified, Tri-Clad open motors, applied during the war years, have stood up to heat, dust, and dampness, operating smoothly and efficiently for years with only minimum maintenance.

Today, the Tri-Clad family includes many different types and sizes. But whatever your selection, the Tri-Clad motor nameplate is still your best assurance of a high return on your motor dollar. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*



EXTRA PROTECTION . . . ***AGAINST PHYSICAL DAMAGE!***

Rigid cast-iron frame and end shields protect vital motor parts from external abuse. Because they're not at the mercy of a coat of paint, they strongly resist chemical attack and dampness. Cast iron also gives you wide nonyielding metal fits between end shields and frame for ease of assembly.

EXTRA PROTECTION . . . ***AGAINST ELECTRICAL BREAKDOWN!***

Motor windings of Formex* wire, together with improved insulating materials, reduce the chances of electrical failure. Heat is dissipated quickly—motor stays young for years and years!

EXTRA PROTECTION... ***AGAINST OPERATING WEAR AND TEAR!***

Bearing design affords longer life, greater capacity, improved lubrication features. Bearing seals retain lubricant, keep out dirt. One-piece, cast-aluminum rotor is practically indestructible.

**Trade-mark reg. U.S. Pat. Off.*

GENERAL ELECTRIC

750-287

TRI-CLAD

REG. U.S. PAT. OFF.

MOTORS

- OPEN (DRIPPROOF)
- TOTALLY ENCLOSED
- EXPLOSION-PROOF

for New protection against Old hazards . . . get WILLSON

Style No. X41

GLOVE-FIT PROTECTION AGAINST SPLASH . . . This Over-All* rubber goggle with snug fitting resilient rolled edge takes the danger out of splash and spatter; provides wearing comfort over spectacles.

Style No. 731

ONE-PIECE CAP CARTRIDGE . . . New chemical cartridge respirator with four interchangeable cap cartridge filters protects against low concentrations of specific vapors and gases. U. S. Bureau of Mines Approved.

Style No. 750D

SETTLE THE DUST PROBLEM . . . Newly approved by Bureau of Mines for all dusts. Easier breathing over long periods provided by extra large dual throw-away filters.

*Reg. U. S. Pat. Off.

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest Willson distributor or write us direct.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

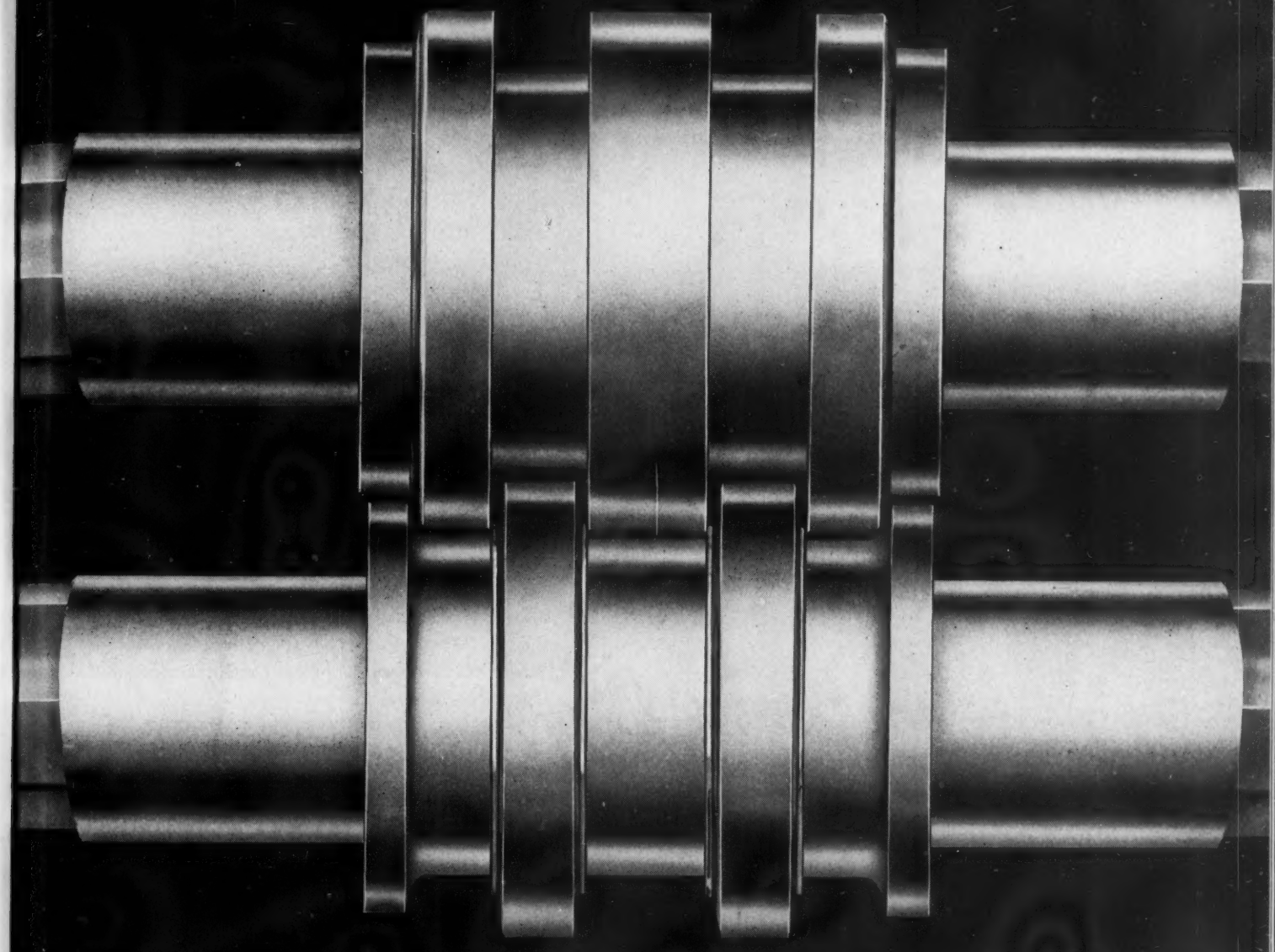
DOUBLE WILLSON

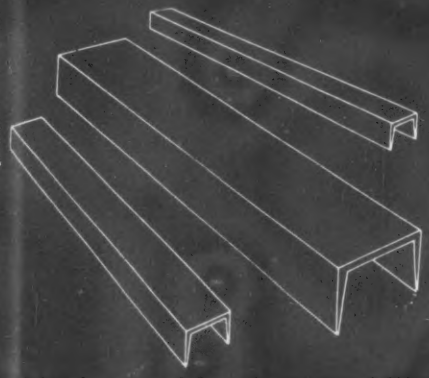
PRODUCTS INCORPORATED

Established 1870

233 WASHINGTON STREET • READING, PENNA.

Economy Starts Here





Select from any of these eleven types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioloy Rolls, Ohioloy "K" Rolls, HOLL-O-CAST Rolls, Chilled Iron Rolls, Alloy Chilled Iron Rolls, Denso Iron Rolls, Nickel Grain Rolls, Special Iron Rolls, Nioloy Rolls, Flintuff Rolls.

Trim production costs at the beginning, whether steel goes into autos, refrigerators or beams. Ohio Steel and Iron Rolls are known for greater tonnage at lower cost. Longer service saves time, cuts costs, gives you a greater economy edge at the start! Specify Ohio Rolls.

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

THE OHIO STEEL FOUNDRY COMPANY · LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO

"We tested them all... Airco 19-9 stainless steel electrodes produced the best welds..."

says Struthers-Wells Corporation, Warren, Pa.

In full they stated: "When we received the contract to fabricate these all-welded stainless steel soup kettles, we ran extensive tests to find the best stainless steel electrode for the job. Welds had to be porosity-free and have a smooth, uniform appearance because the vessels were to be machined down and polished. Airco 19-9 stainless steel electrodes produced the best welds of all electrodes tested. Tests showed a tensile strength of 85,000 lbs. per square inch and an extremely low corrosion rate loss of .00075" per month in boiling nitric acid."

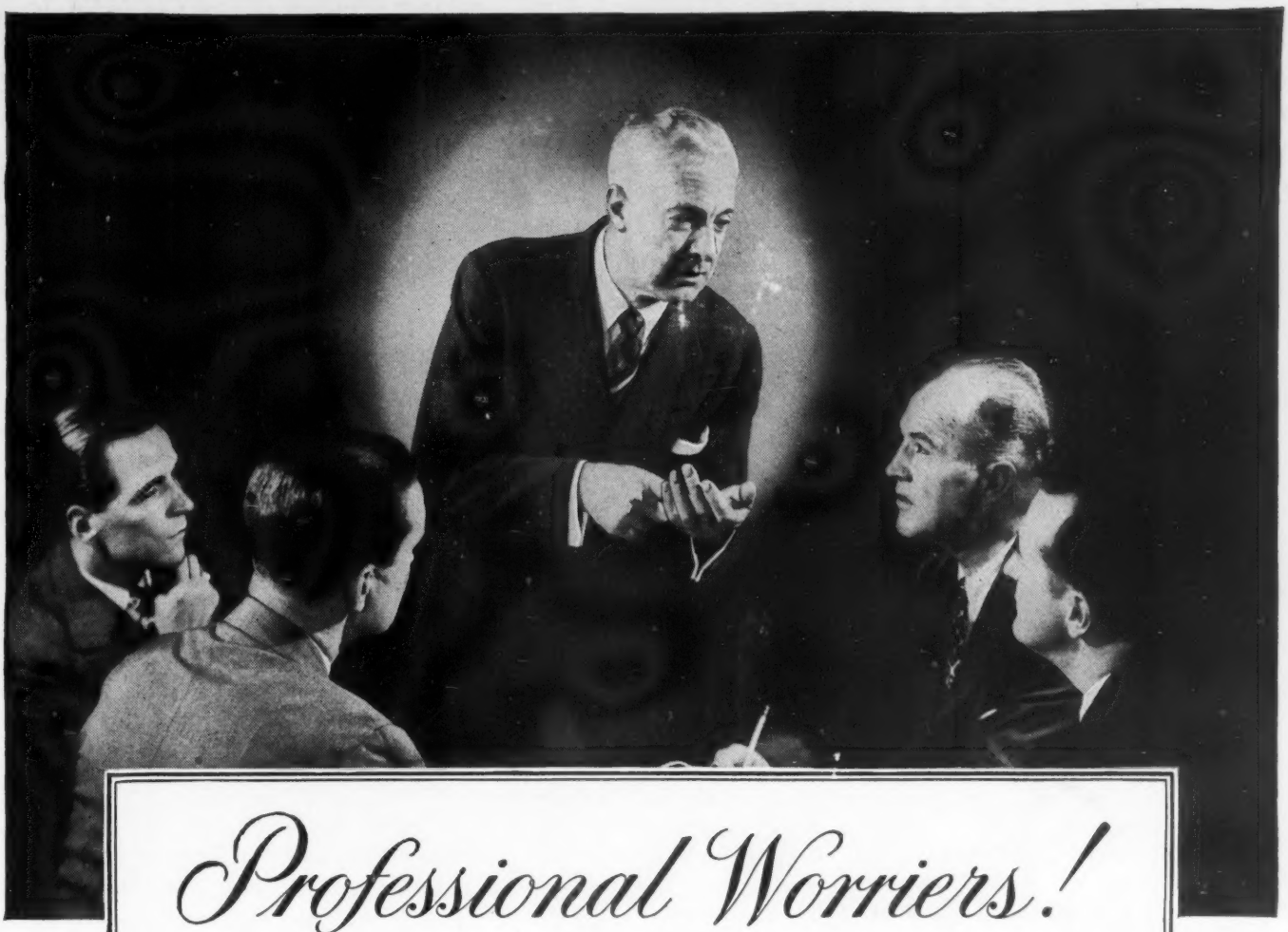
Airco Stainless Steel electrodes are available with a titania coating for A.C.-D.C. application. Lime-type coatings for D.C. application are also available when required. Most operators prefer the A.C.-D.C. type because when used on A.C. arc blow is eliminated, which in turn, results in easier manipulation, more uniform arc action, and better appearance of deposit. Both produce an easily removed slag coating.

For further information regarding Airco's extensive stainless steel electrode line, or any other arc welding electrodes write for a copy of our latest Electrode Catalog. For your free copy address: Dept. S 7813, Air Reduction, 60 East 42nd Street, New York 17, New York. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

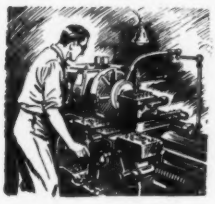
HEADQUARTERS FOR OXYGEN, ACETYLENE AND OTHER GASES . . . CARBIDE . . . GAS WELDING AND CUTTING APPARATUS AND SUPPLIES . . . ARC WELDERS, ELECTRODES AND ACCESSORIES



Professional Worriers!

Every business, time and again, runs into production snags. When the problem is *lubrication*, we're often called in to do the worrying. And eight times out of ten we come up with the right answer—*fast*. Because that's our job day in, day out, year after year—putting petroleum to work *efficiently*. This backlog of experience, coupled with the world's finest lubricants and fuels, is your best reason for calling Cities Service next time trouble calls on you.

CITIES SERVICE STOPPED TROUBLE HERE!



A screw products company in Cuyahoga Falls, Ohio, called on Cities Service for advice on machining a part of an intricate mechanism made of aluminum that required extreme accuracy and finish. Chillo Oil No. 22 was recommended. Thereafter, the manufacturer reported the machined work was not only well within the required tolerances, but the work had a mirror-like finish. Tool life was also phenomenally good.

A brick and tile company in Iowa suffered numerous failures of the main drive-shaft bearings in their Hammer Mill Crushers. Cities Service engineers recommended Pacemaker Oil No. 2. The last report from the company said that since they standardized on this lubricant, no bearing failures have occurred.

"We use Solvent No. 26 for cleaning surplus oil and grease out of electric clock movements and we find it unexcelled for this purpose" ... so writes the president of an Illinois watch repairing and rebuilding concern after continued use of this remarkable new Cities Service metal cleaning fluid.

A bus company executive in Cleveland, Ohio, recently said, "During the past four years, we used Cities Service Heavy Duty type oil with outstanding results—minimum wear, freedom from sludge and no engine failures—which has enabled us to give uninterrupted service to our customers."

CITIES SERVICE OIL CO.
New York—Chicago

CITIES SERVICE

ARKANSAS FUEL OIL CO.
Shreveport, La.

Cities Service Oil Company
Room 294, Sixty Wall Tower
New York 5, N. Y.

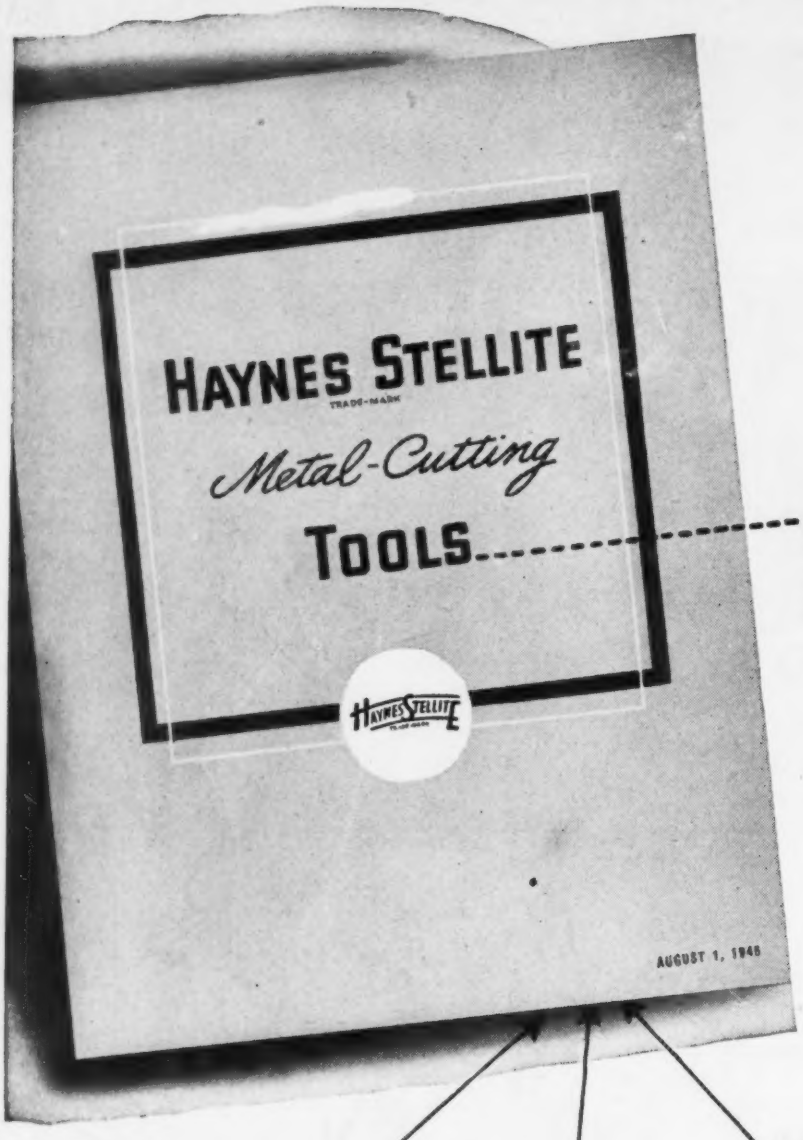
Gentlemen: I have a production problem that involves lubrication. I would like to discuss it with one of your lubrication engineers, without obligation, of course.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____



for high production at low cost

HAYNES STELLITE metal-cutting tools are made of specially developed alloys of cobalt, chromium, and tungsten. They are used efficiently and economically for machining most machinable materials—and for nearly all machining operations. These uniform, dependable tools operate at heavy feeds and high speeds—with long life between grinds. This means high production at low cost per piece machined.

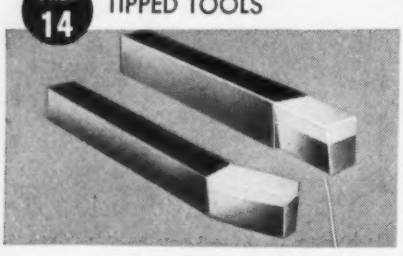
You can order HAYNES STELLITE standard tools or special tools to your specifications through any Haynes Stellite Company Office. For more descriptive information, write for your copy of the new revised edition of "HAYNES STELLITE Metal-Cutting Tools," Form 5401.

AVAILABLE STANDARD TYPES

PAGE 6 SOLID TOOL BITS

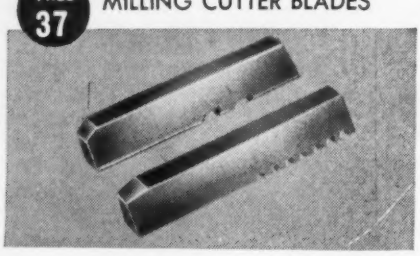
Square, flat, or round—in a wide range of sizes—finish-ground ready for use.

PAGE 14 TIPPED TOOLS



A large variety of styles and sizes—for use where solid bits are impractical.

PAGE 37 MILLING CUTTER BLADES



For many cutter body types—supplied finish-ground to close tolerances.

HAYNES *alloys*

TRADE-MARK

Haynes Stellite Company

Unit of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

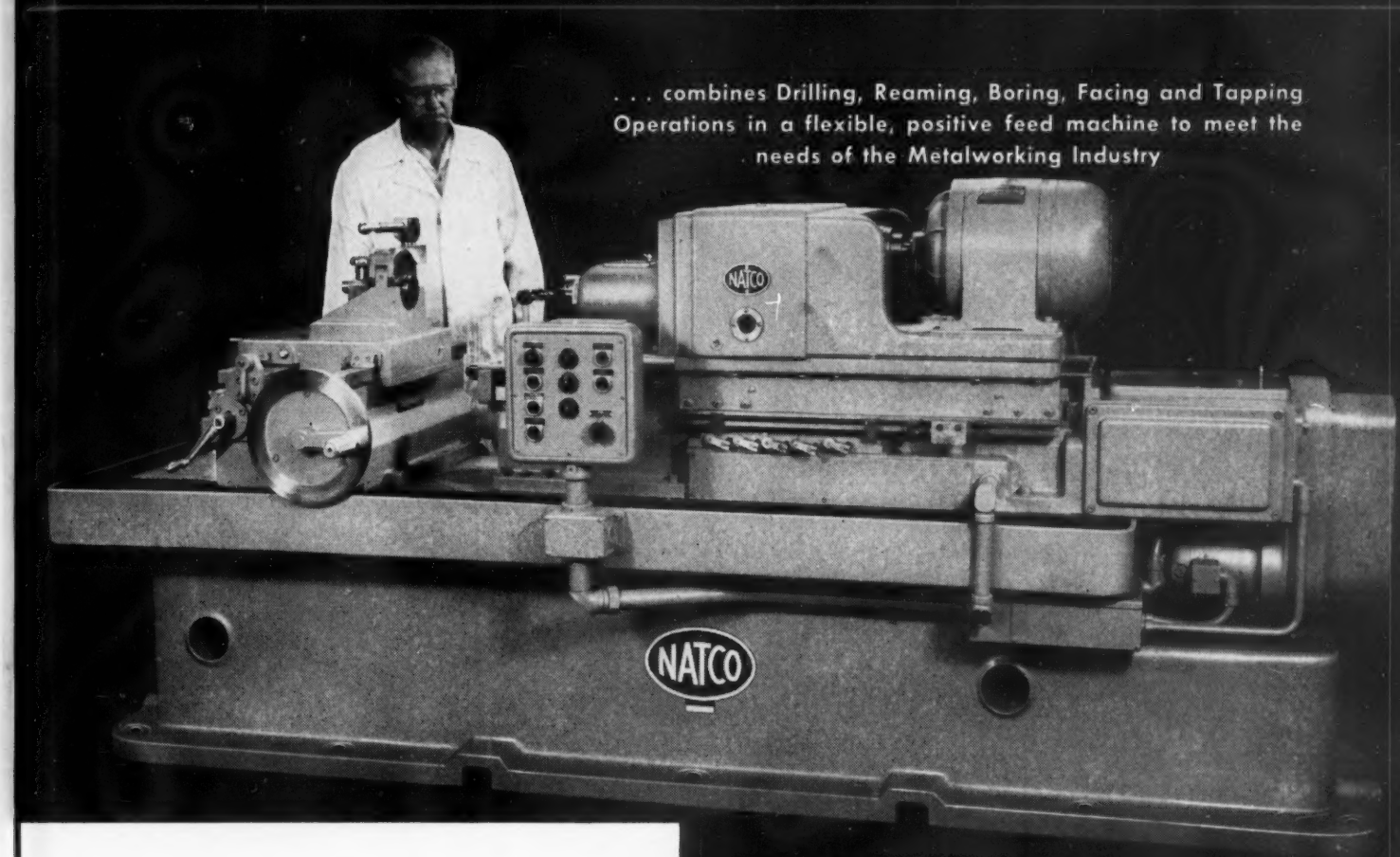
Chicago—Cleveland—Detroit—Houston—Los Angeles
New York—San Francisco—Tulsa

The registered trade-marks "Haynes" and "Haynes Stellite" distinguish products of Haynes Stellite Company.

New NATCO A-42 ELECTRONIC

Mechanical Feed Unit... Entirely Self-Contained

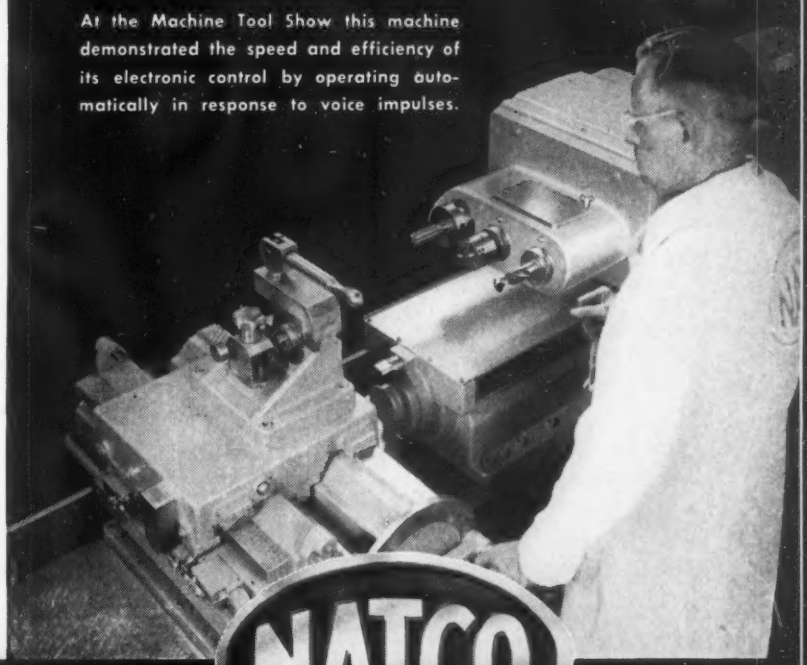
FEEDS IN BOTH DIRECTIONS



. . . combines Drilling, Reaming, Boring, Facing and Tapping Operations in a flexible, positive feed machine to meet the needs of the Metalworking Industry

This highly adaptable NATCO A-42 Electronic Mechanical Feed Unit provides electronically controlled automatic work cycles such as rapid traverse forward, coarse feed forward, fine feed forward, dwell, rapid traverse return, and stop, or rapid traverse forward, feed forward, feed backwards, rapid traverse return, and stop, and many other combinations. The unit can be mounted in any position to form a part of highly specialized machines made up of combinations of NATCO units for high production of a wide variety of work. Write Dept. S for NATCO Bulletin 747.

NATCO DRILLING, BORING, TAPPING AND FACING MACHINES



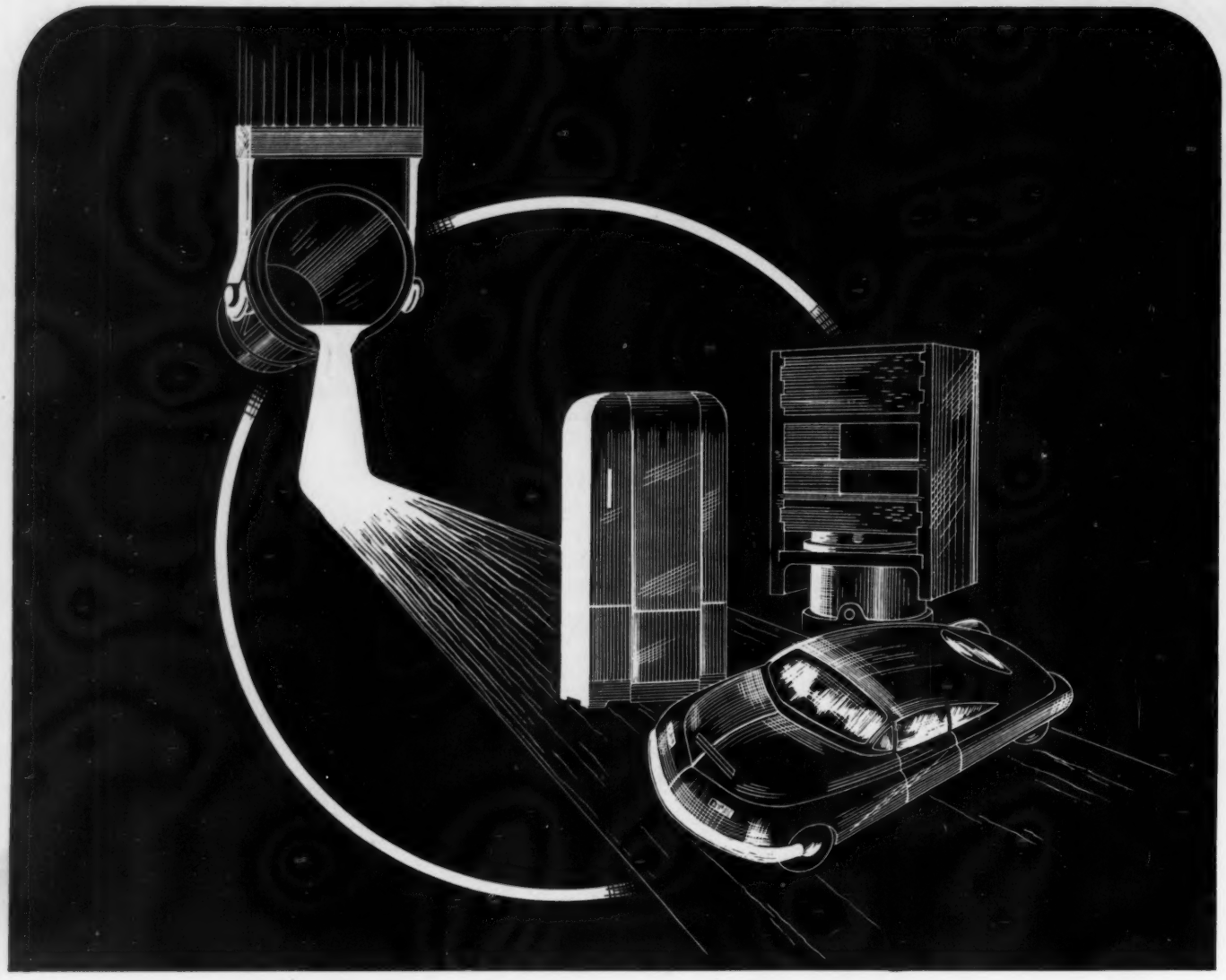
At the Machine Tool Show this machine demonstrated the speed and efficiency of its electronic control by operating automatically in response to voice impulses.

NATCO

NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.

Branch Offices: 1809 Engineering Bldg., Chicago • 409 New Center Bldg., Detroit • 1807 Elmwood Ave., Buffalo • 2902 Commerce Bldg., New York City

Call a Natco Field Engineer



SINCE 1850

THE STEEL INDUSTRY

in its advance to a position of pre-eminence in the world of metals, has been paced by the production and transportation of the necessary ores. The Cliffs organization is geared to meet the ore needs of the future as adequately as it has met those of the past ninety-eight years.

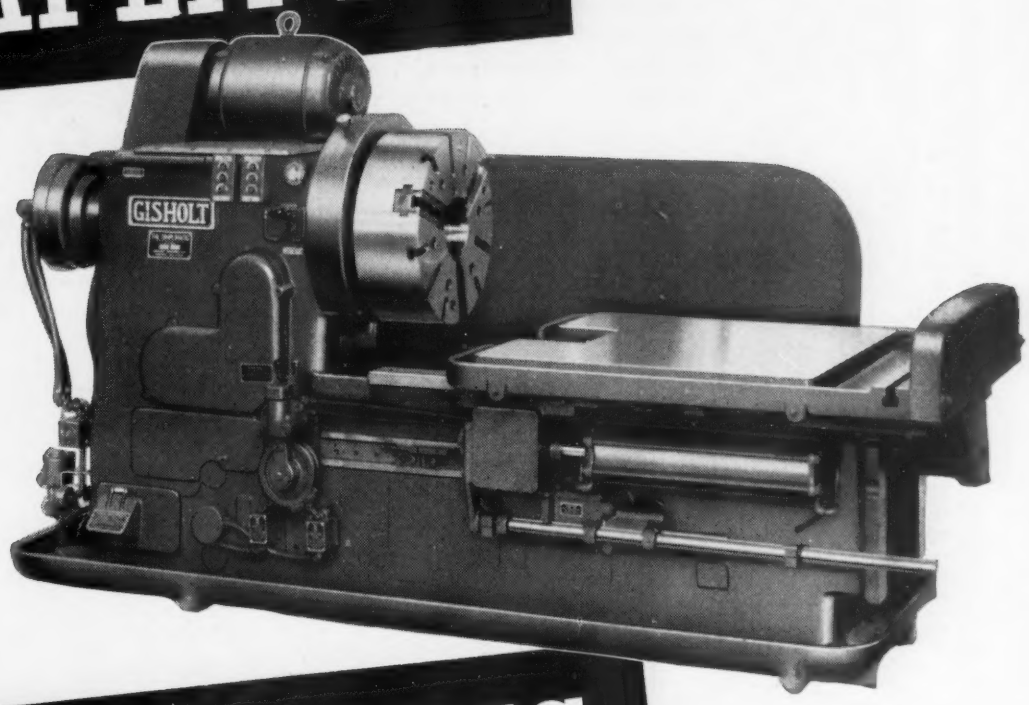
LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

SIMPLIFY

your "special" jobs with the GISHOLT



SIMPLIMATIC

Where you have sufficient volume for automatic machining, you, too, may find the low-cost answer in the Simplimatic.

For here's such adaptability in simple, basic design that it gives you an individualized machine to handle many diverse and unusual problems. Here are some of the reasons:

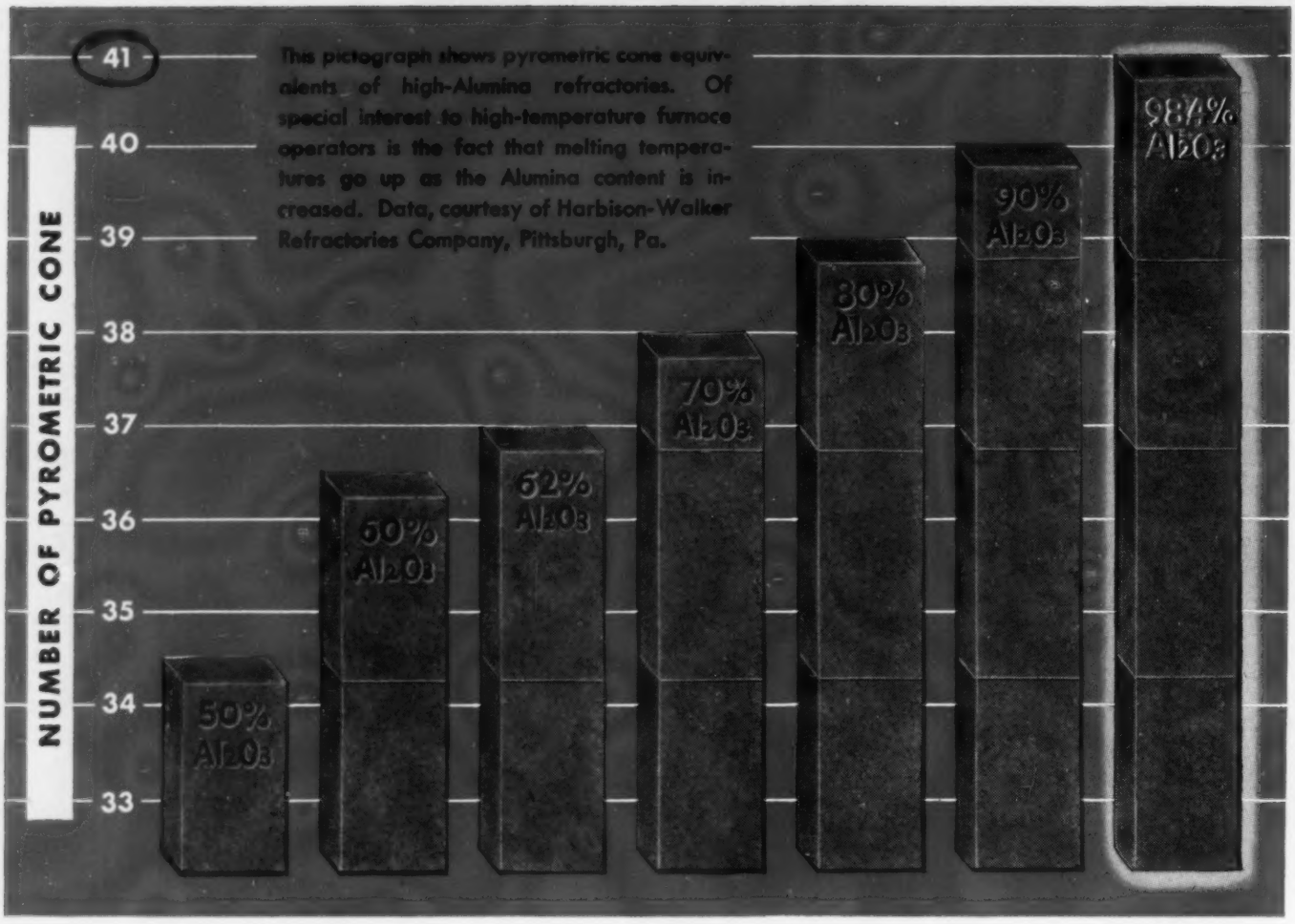
1. *A wide variety of slide positions is possible on the large platen table for straight and angular feeds.*
2. *Tailstock, hand or pneumatically operated, can be mounted on platen table for between-centers work.*
3. *Linkage arrangement between slides permits spherical boring in conjunction with facing and turning.*
4. *Back facing or back boring through the spindle can often be combined with other cuts in a single operation.*
5. *Vertical head can be used where it provides more favorable working position, with slides cammed individually or entire head cammed as a unit.*
6. *Simultaneous double end machining is possible with full utilization of the base machine.*

Now, with higher costs for labor and materials, investigate the economies the Simplimatic can bring you. Get the facts.

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts.

GISHOLT MACHINE COMPANY
Madison 3 • Wisconsin

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SUPERFINISHERS • SPECIAL MACHINES



This pictograph shows pyrometric cone equivalents of high-Alumina refractories. Of special interest to high-temperature furnace operators is the fact that melting temperatures go up as the Alumina content is increased. Data, courtesy of Harbison-Walker Refractories Company, Pittsburgh, Pa.

Step up furnace life

. . . with ALCOA ALUMINA

You can read your own operational economies into this chart. Costly down-time is cut to moderate levels, because ALCOA Alumina gives refractories strength and stability at temperature even beyond 3500° F. In addition, you get measurably higher operating efficiency for the entire life of the refractory lining.

Naturally these refractories cost more. They're worth more! Actually their better properties, longer life and the consequent reduction of production stoppages make them the most economical refractories that you can buy.

BUY FROM YOUR REFRACTORY MANUFACTURER

We do not make refractories, but brick and other shapes containing various percentages of ALCOA Alumina are available from leading manufacturers.

We'll gladly refer you to sources of supply. Call your nearest Alcoa sales office or write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 1782 Gulf Building, Pittsburgh 19, Pa.

REFRACTORIES MADE OF ALCOA ALUMINA:

- Have higher strength and better stability under load at high temperatures.
- Resist spalling and fluxing at high temperatures.
- Resist corrosive slags and gases.
- Reduce porosity and shrinkage to negligible factors.

ALCOA

ALUMINUM

ALCOA CHEMICALS

ALUMINAS AND FLUORIDES

FORMERLY SOLD UNDER THE TRADE NAME "ALORCO"

"Which Squirrel-Cage Motor Shall I Buy?"

Open-Type? This general-purpose squirrel-cage motor meets about 9 out of every 10 application requirements; so chances are it's the design you'll select. Allis-Chalmers builds generously proportioned, rugged *open-type* squirrel-cage motors in sizes from 1 hp to the largest practical requirement.

Splash-Proof? Where operating conditions are conducive to entrance of particles or liquids into ordinary motors from either top or sides, Allis-Chalmers *splash-proof* squirrel-cage motors may be your best buy. They're designed to *exclude* top or side directed particles and liquids. Sizes 1 hp to the largest.

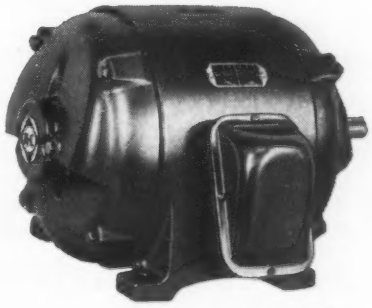
Vertical? or Flange-Type? *Either* can solve a space problem. *Vertical* motors (sizes 1 hp to largest) for vertical drives. *Flange-mounted* for side or angle drives. In both types bearings and closures are designed to prevent grease escapement. Mounting flange for attaching to your base can be provided.

Totally-Enclosed? Explosion-Proof? Completely weather-proof and fan-cooled, these motors are built to beat abrasive dust, dirt and corrosive fumes, or moisture conditions that cause windings in ordinary motors to deteriorate. *Explosion-proof type* for oil refineries, paint, varnish or lacquer plants, etc.; Underwriters approved; reduce hazards in explosive or dust atmospheres. Either type built from 1 hp and up.

Are Motor Decisions More Important Today?

YOU BET THEY ARE! One *obvious* reason is the need for keeping costs down. Another is that in the rush to fill demand much equipment is being misapplied; making it harder to maintain profits not alone today, but tomorrow, the next day and the next year—as long as misapplication continues!

That's why it's important to take a good look at motors — their characteristics — your equipment — power source and surroundings — *before* you buy and apply! If you're in doubt, don't take chances — call a motor expert! ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2327



1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment-
Biggest of All in Range of Industrial Products

overhung loads?

DE LAVAL SLEEVE BEARINGS

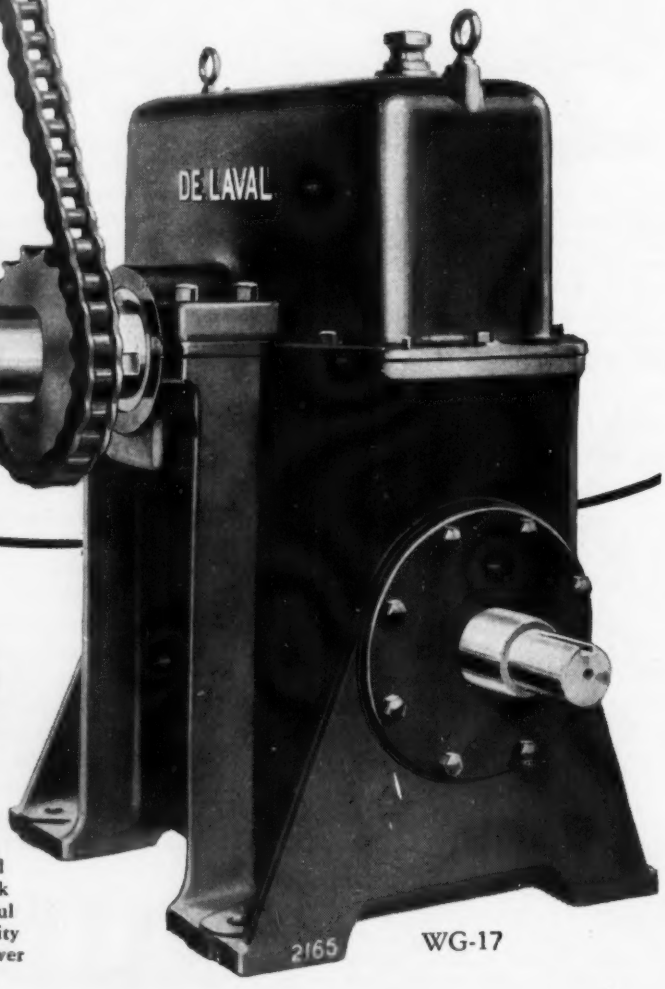
For carrying heavy overhung loads imposed by gears, cranks, pulleys or sprockets, De Laval Worm Gear Speed Reducers can be furnished with generously proportioned sleeve bearings on the output shaft; a choice of either sleeve bearings or anti-friction bearings being available in most models. Both can be depended upon for trouble-free service.

ILLUSTRATION NOTE:

Use of an auxiliary chain and sprocket, with the worm gear speed reducer carrying the major reduction, allows ease of subsequent change of over-all speed reduction, facilitates interchangeability of speed reducers throughout the plant, and reduces installation costs.

If your speed reducers require an overhung load, consult a De Laval representative.

ONE OF 93. This single reduction De Laval Worm Gear Speed reducer is available with many standard gear ratios and is but one of 93 sizes of standard De Laval Worm Gear Speed Reducers.



WG-17

Worm Gear Division

DE LAVAL

Steam Turbine Company

Trenton 2, New Jersey

Atlanta • Philadelphia • Charlotte • Pittsburgh • Cleveland
Rochester • Detroit • San Francisco • Chicago • New York
Denver • Kansas City • Helena • Boston • Houston • St. Paul
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TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

KEEP IT CLEAN !!!

Welding with G-E CONTROLS gives CLEANER RESULTS, TWICE AS FAST

FOOD MACHINERY CORP. of San Jose, Calif. REPORTS, "We find spot welding with G-E controls twice as fast as any other method for fabricating our food processing machines. And it's a cleaner process with smoother, finished welds."

From splash guards for pear machines to fruit cocktail fillers, G-E controls assure automatic and accurate timing of the welding cycle—faster, more consistent welding.

HERE ARE 4 OTHER ADVANTAGES

- Easy to Operate
- Minimum Maintenance
- Low Upkeep Costs
- Adjustable to Different Gage Metals

NEW LINES OF G-E SYNCHRONOUS AND NONSYNCHRONOUS WELDING CONTROLS

1. Control is factory-assembled in one, easy-to-install cabinet
2. Easy servicing through large side door of cabinet
3. Control station always faces operator

SEE

"This Is Resistance Welding," G.E.'s full-color movie explaining what resistance welding is, and where and how it has improved production. Your nearest G-E office, local utility, or resistance welding machinery manufacturer will be glad to arrange a free showing for you.

For more information on these new lines of G-E welding controls, ask for bulletins GEA-4699 and GEA-4726.

GENERAL ELECTRIC

Apparatus Department, Sec. E 645-44
General Electric Company
Schenectady 5, N. Y.

Please send me your free bulletins on the new lines of G-E welding controls:

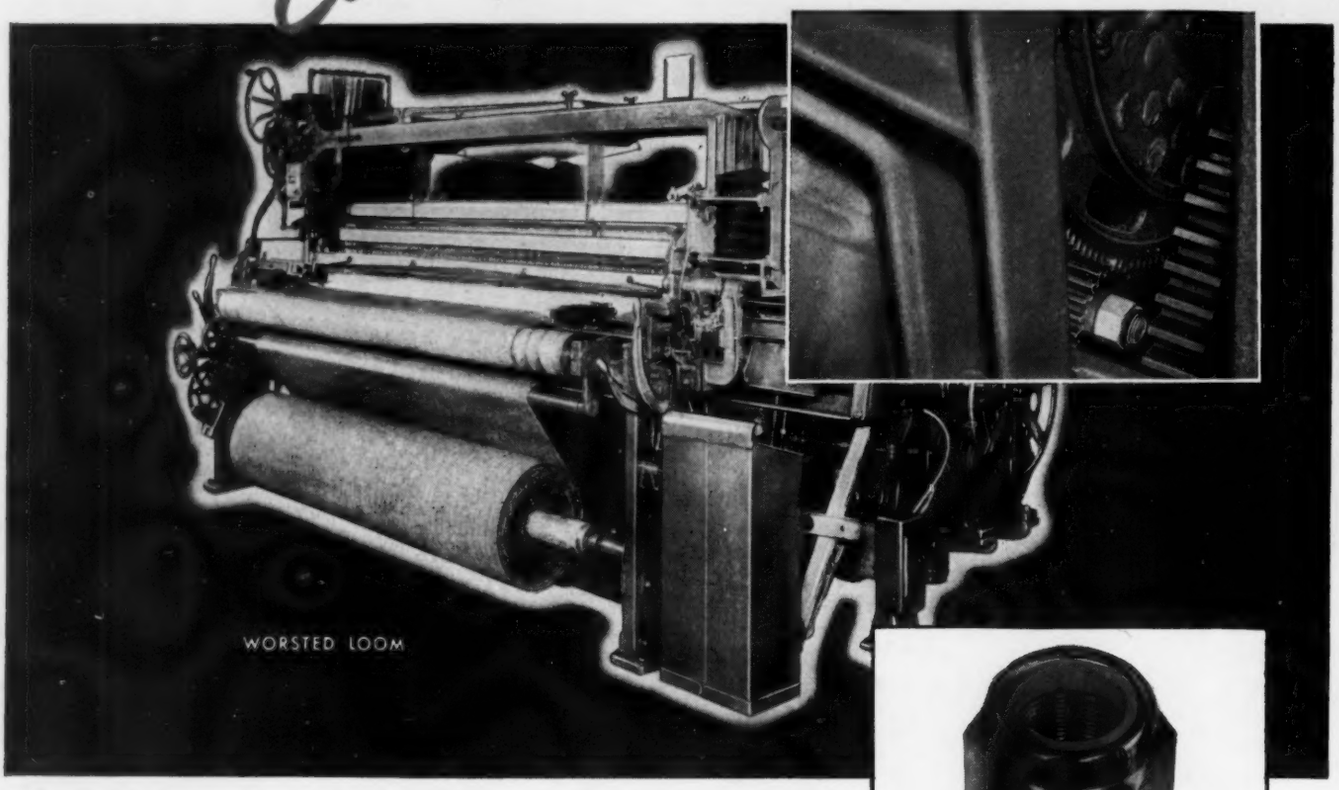
- ☐ GEA-4699, Synchronous Precision Controls for Spot and Projection Welding
- ☐ GEA-4726, Nonsynchronous Electronic Controls for Spot and Projection Welding

Name .....

Company .....

Address .....

SELF-LOCKING *Prevents Costly Wear* ON THE MOTOR PINION GEAR SHAFT



The Red Elastic Collar protects prestressed settings against IMPACT! VIBRATION!

Vibration—built up by the distinct shock, or pounding, of the gears at pick and beat up—can cause costly wear if the pinion gear fastener fails. A loose pinion gear has a tendency to cause excessive tooth wear. This may result in changed gear alignments, replacement damage to the tapered armature shaft, and upset split-second, synchronized loom timing. Finally uneven power delivery produces a wavy cloth condition that degrades goods to #2 or #3 quality.

Here's a suggestion to loom fixers: Apply ESNA Elastic Stop Nuts to your pinion gears and other vibration trouble spots every time you have to remove an ordinary fastener for repairs or adjustment. Your maintenance orders can be filled immediately from stock.

Re-usable Elastic Stop Nuts—with the self-locking, self-sealing Red Elastic Collar—provide dependable protection against Vibration, Thread Corrosion, Thread Failure, and Liquid Seepage. ESNA engineers are now ready to study your fastener problems. Address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and leading Distributors are located in many principal cities.

LOOK FOR THE RED COLLAR

THE SYMBOL OF SECURITY

It is threadless and dependably elastic. Every bolt—*regardless of commercial tolerances*—impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads—and eliminates all axial play between the bolt and nut.

All ESNA Elastic Stop Nuts—*regardless of size or type*—lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.

ESNA TRADE MARK

ELASTIC STOP NUTS

INTERNAL WRENCHING

ANCHOR

WING

SPLINE

CLINCH

GANG CHANNEL

NYLON CAP

***PRODUCTS OF:* ELASTIC STOP NUT CORPORATION OF AMERICA**

FROM ORE TO ORDER

WEIRTON STEELS ARE IN THE HANDS OF MASTER STEEL WORKERS

At blast furnace, open hearth and mill, the Weirton men who translate base ore into finished steels are masters of their trade. They know steel, think steel, live steel. The skill and experience they apply to each operation are essential ingredients in every ton of Weirton steel.

WEIRTON STEEL CO.

WEIRTON, W. VA. *Sales Offices in Principal Cities*

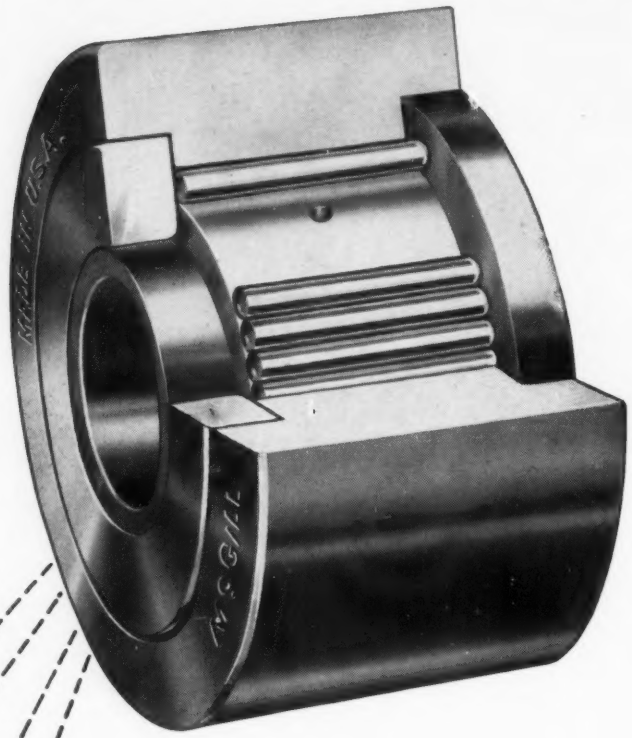
Division of NATIONAL STEEL CORPORATION *Executive Offices, Pittsburgh, Pa.*

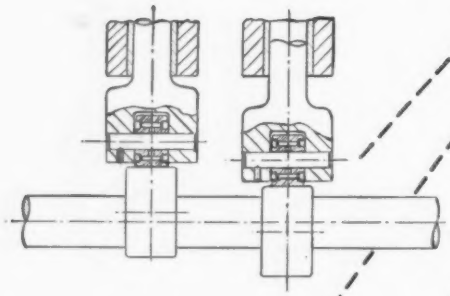
WEIRTON STEEL COMPANY

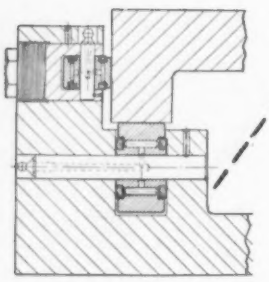
NATIONAL STEEL

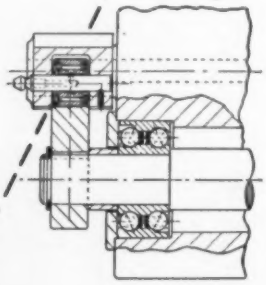
. . . another McGILL first

THE NEW McGILL MULTIROL® CAM YOKE ROLLER









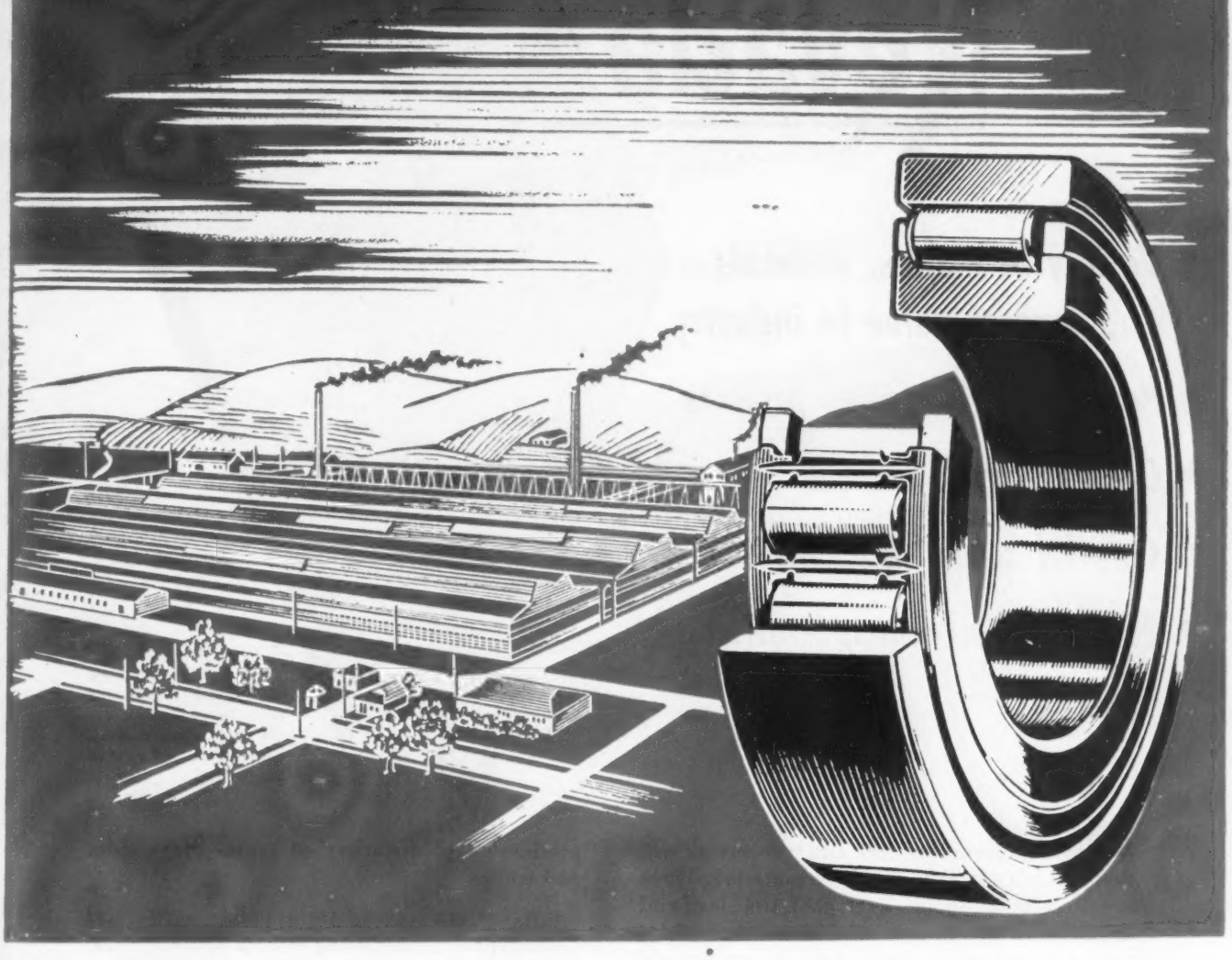
McGill MULTIROL Cam Yoke Roller Bearings represent the latest development in full type roller bearings. The new CYR Series will provide greater adaptability of MULTIROL Cam Followers for all types of automatic machinery. They are specially suited for cam action or controlled motion of machine parts requiring guide or support rollers.

With an inner race replacing the usual stud, a full range of shaft sizes can be accommodated from .250 to 1.25 resulting in almost unlimited methods of mounting. The outer race sections are built extra heavy for shock load resistance and with the same internal construction as the MULTIROL Cam Follower Series. Send your problems to McGill Engineers, McGill Manufacturing Company, Inc., 401 North Lafayette Street, Valparaiso, Indiana.

Write for your free copy of Bulletin CY-47 on the new Multirol CYR Bearings.

McGILL precision bearings

MAKE TYCOL ENGINEERED LUBRICATION A WORKING PARTNER



for increased production . . . lower operating costs

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C.
Chicago • Detroit
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TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE — NEW YORK 4, N. Y.

For increased production . . . top efficiency . . . lower operating cost, give your machines superb lubricants – Tycol *Engineered* oils and greases. Tycol lubricants are made to meet every lubrication need of industry – from roll neck greases for steel mills to spindle oils.

Each Tycol lubricant is *scientifically engineered* to meet specific service conditions. In every step, from selection of crudes to blending of the finished product, Tycol lubricants are processed to provide maximum lubricating efficiency which means greater economy, longer machine life for every type of equipment.

Tide Water Associated engineers are thoroughly experienced in all phases of industrial lubrication. Let them help you in selecting the Tycol lubricant best suited to your specific need. Write, or wire your nearest Tide Water Associated Office for complete information.

LUBRICATION—"ENGINEERED TO FIT THE JOB"

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Nevada

- *Variety of metals, minerals and ores of value to industry*
- *Power and irrigation projects*
- *Good living conditions*
- *Colorful scenic attractions*
- *Excellent rail transportation*

* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

Manufacturers, packers and processors will find Nevada a storehouse of raw materials. There are deposits of copper, silver, gold, zinc, lead and uranium. Mineral ores and minerals include tungsten, manganese and antimony ore, magnesite, gypsum, sulphur, borax and vanadium. Building stone and marble also are available.

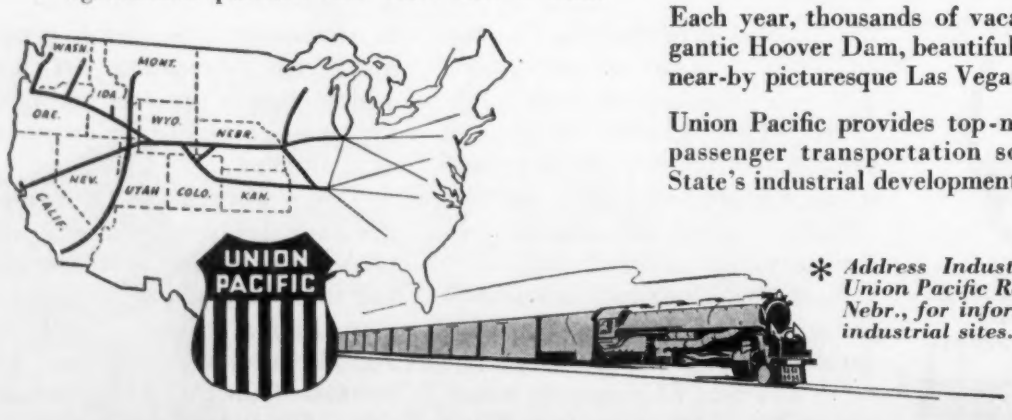
Cattle, sheep and poultry raising are expanding agricultural pursuits and there also is some production of a variety of grains, vegetables and fruits.

Irrigation and power are supplied by several Federal projects including famous Hoover Dam.

Nevada's healthful climate, excellent educational system, and a variety of scenic attractions contribute to the advantages of living in this western area.

Each year, thousands of vacationists visit gigantic Hoover Dam, beautiful Lake Mead and near-by picturesque Las Vegas.

Union Pacific provides top-notch freight and passenger transportation so essential to a State's industrial development.

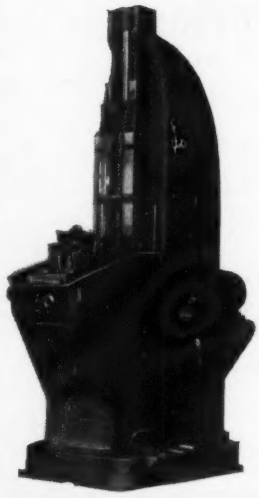


* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

INVESTIGATE *Surface Broaching* FOR DIFFICULT MACHINING WORK



Footburt Single Slide Surface Broaching Machine. Also furnished as a duplex machine. Both in 3, 5, 10, 15 and 25 ton sizes

Throughout the metal working field there are many parts that can be surface broached at remarkable savings over the costs of the present machining method. The aircraft, automotive, small tool, appliance and even sporting goods manufacturers have all found ways of making parts faster, cheaper and to finer tolerances through the use of Footburt Surface Broaching Machines. We will be glad to work with you on the application of surface broaching.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

Detroit Office: General Motors Building

Footburt Patented Tooth Form

FOOTBURT *Surface Broaching*

ANNOUNCING the NEW...

BBZ-200 Bright Barrel Zinc Process

Zinc plating comes out of the barrel BRIGHT!

Right from the plating barrel *flashing bright* comes zinc-plated work processed this new H-VW-M way. Finished products plated by the BBZ-200 Bright Barrel Zinc Process *stay* bright longer, too . . . don't oxidize readily, resist tarnish.

Developed by H-VW-M expressly for barrel zinc plating only, this process produces its characteristic brilliant deposits over a wide range of current densities. Subsequent bright dipping is not necessary. *Low concentration* of BBZ-200 Brightener in the bath and *low consumption* add ECONOMY to the process's other virtues.

At no cost, you can learn how to get
FINER RESULTS WITH YOUR PRESENT SOLUTION

Almost all existing cyanide solutions can be readily converted to yield the superior results that set the BBZ-200 Process apart. Send sample of your present solution to H-VW-M—without obligation or cost—for chemical analysis and recommendations for conversion.

Or, you can get the required chemicals, the BBZ-200 Brightener and the recommended ZA Anodes . . . together with instructions . . . from H-VW-M.

Get acquainted with this new way to *brighter zinc deposits*. Send sample of your present plating barrel cyanide solution for free analysis . . . or better yet, write for full details today.

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

PLANTS: MATAWAN, NEW JERSEY · ANDERSON, INDIANA

SALES OFFICES: ANDERSON · CHICAGO · CLEVELAND · DAYTON · DETROIT · GRAND RAPIDS MATAWAN · MILWAUKEE · NEW HAVEN · NEW YORK · PHILADELPHIA · PITTSBURGH · ROCHESTER SPRINGFIELD (MASS.) · STRATFORD (CONN.) · SYRACUSE

HANSON-VAN WINKLE-MUNNING CO. · MATAWAN, NEW JERSEY, U.S.A. · SINCE 1820

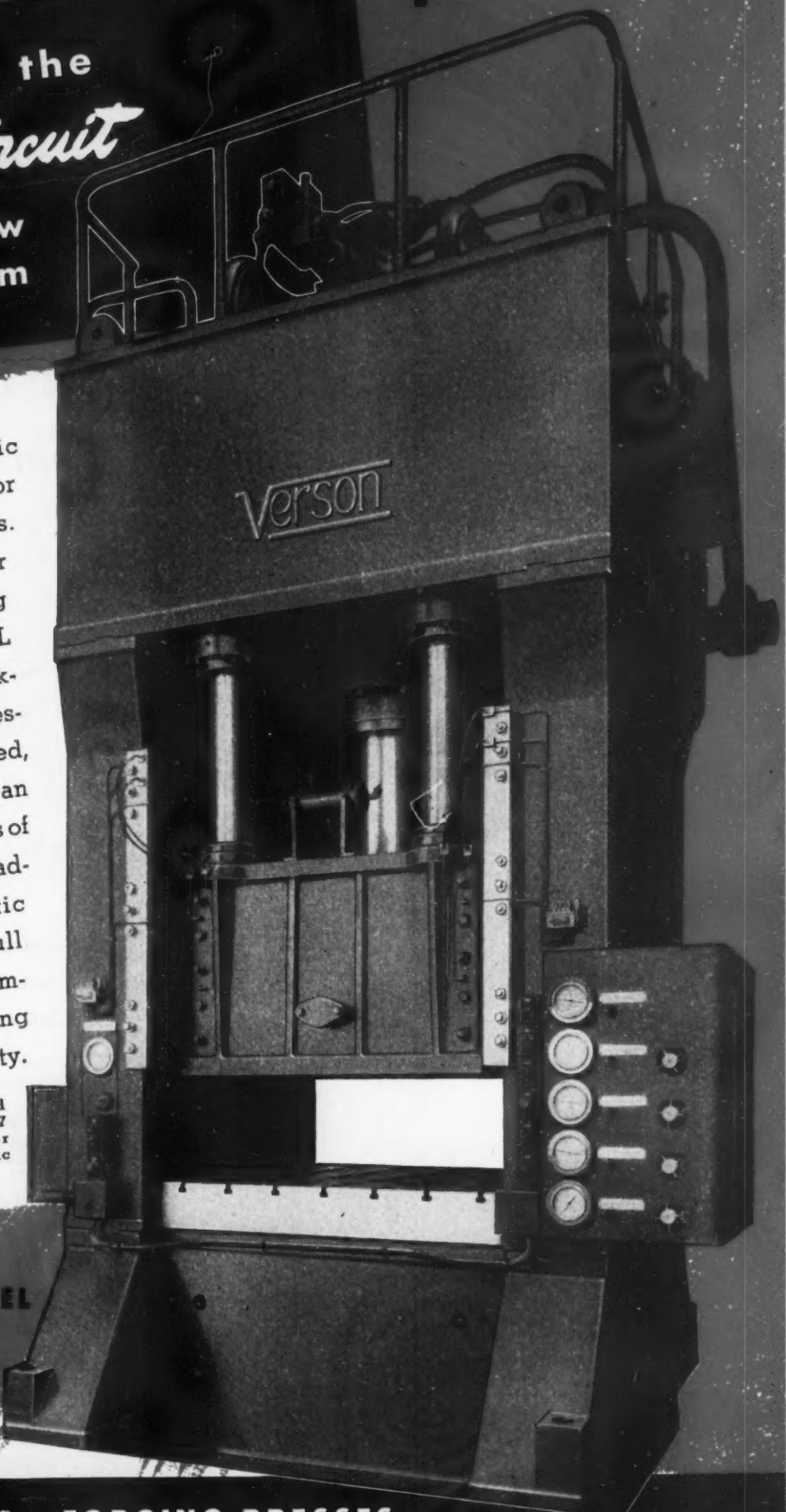
⊕ 2710

Verson

double action hydraulic presses

now equipped with the HYDROL Speed Circuit

. . . the revolutionary new simplified hydraulic system



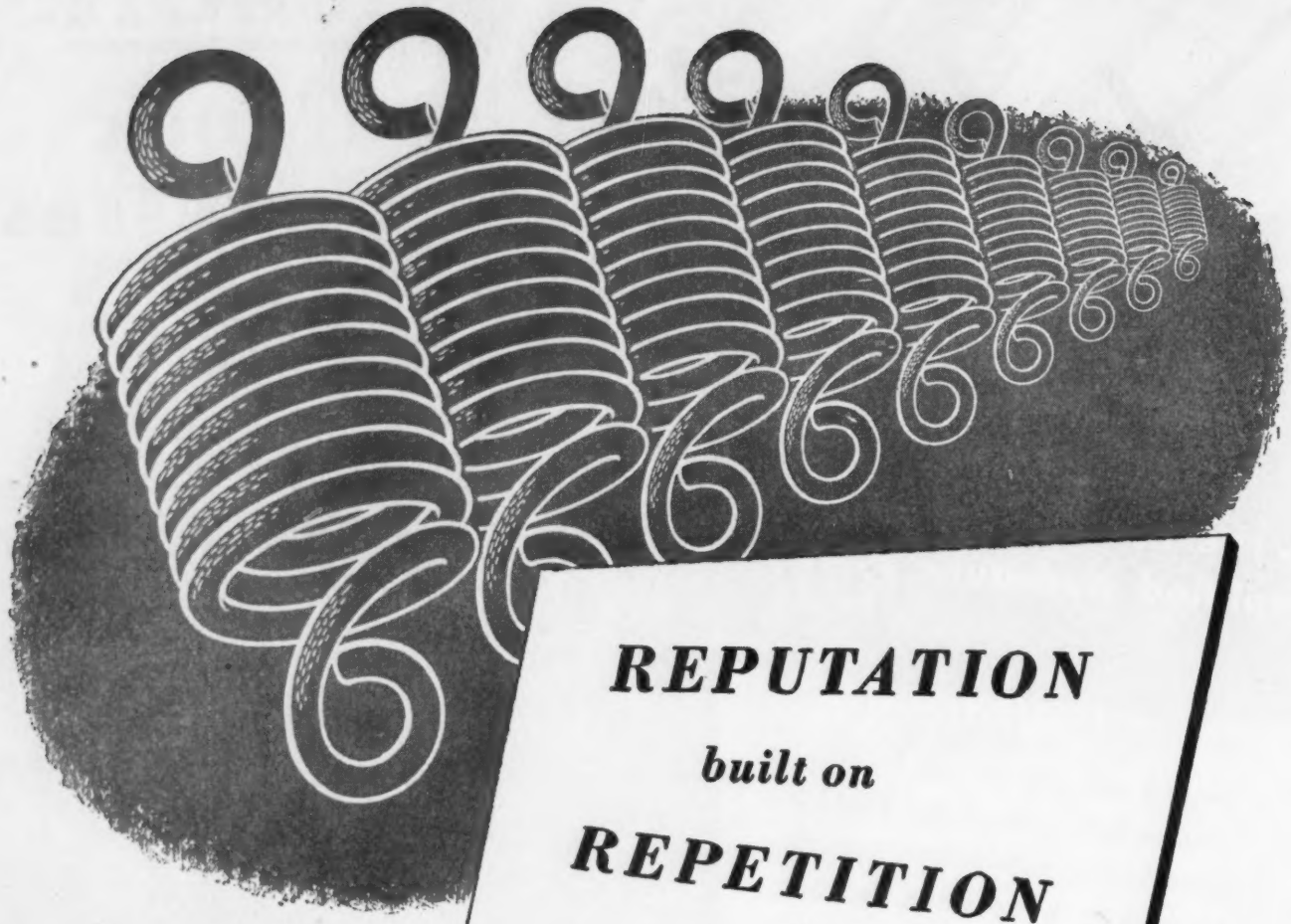
Verson double action hydraulic presses have long been noted for remarkable production records. Now they have been further improved by incorporating into them the Verson HYDROL Speed Circuit. With this remarkable hydraulic system high pressure lines have been shortened, valving and piping reduced to an absolute minimum. Advantages of the HYDROL circuit are fast advance of ram with automatic shockless changeover to full pressure . . . automatic decompression virtually eliminating dwell . . . greater productivity.

• Details of the HYDROL Speed Circuit are given in Catalog H-47 as well as full data on other features of Verson Hydraulic Presses. Ask for a copy.

VERSON ALLSTEEL PRESS CO.
9318 S. Kenwood Ave.
Chicago 19, Illinois

Originators and Pioneer Builders of Allsteel Welded Presses

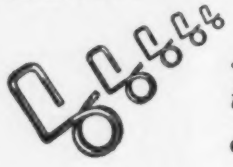
POWER PRESSES • CLUTCHES • FORGING PRESSES
DIE CUSHIONS • HYDRAULIC PRESSES • PRESS BRAKES



REPUTATION
built on
REPETITION

. . . that's right . . . repetitive spring action that gives mechanisms life, pep and power . . .

Uniformity to specifications on repeat orders . . .



Job engineering that results repeatedly in production savings on simple or complex spring designs.

Barnes customers are usually "repeat" customers . . . the reasons for which our representatives will be glad to tell. Ask them at the first opportunity.

Wallace Barnes SPRINGS

SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONN.

DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO

CHECK THESE FREE BULLETINS

- **Centrifugal Castings** of non-ferrous metals and alloys . . . Bulletin No. 143.
- **Centrifugal and Static Castings** of plain and alloyed irons . . . Bulletin No. 144.
- **Centrifugally Cast Tubular Bushing Stock** (and solid bars) in all standard sizes . . . Bulletin No. 145.

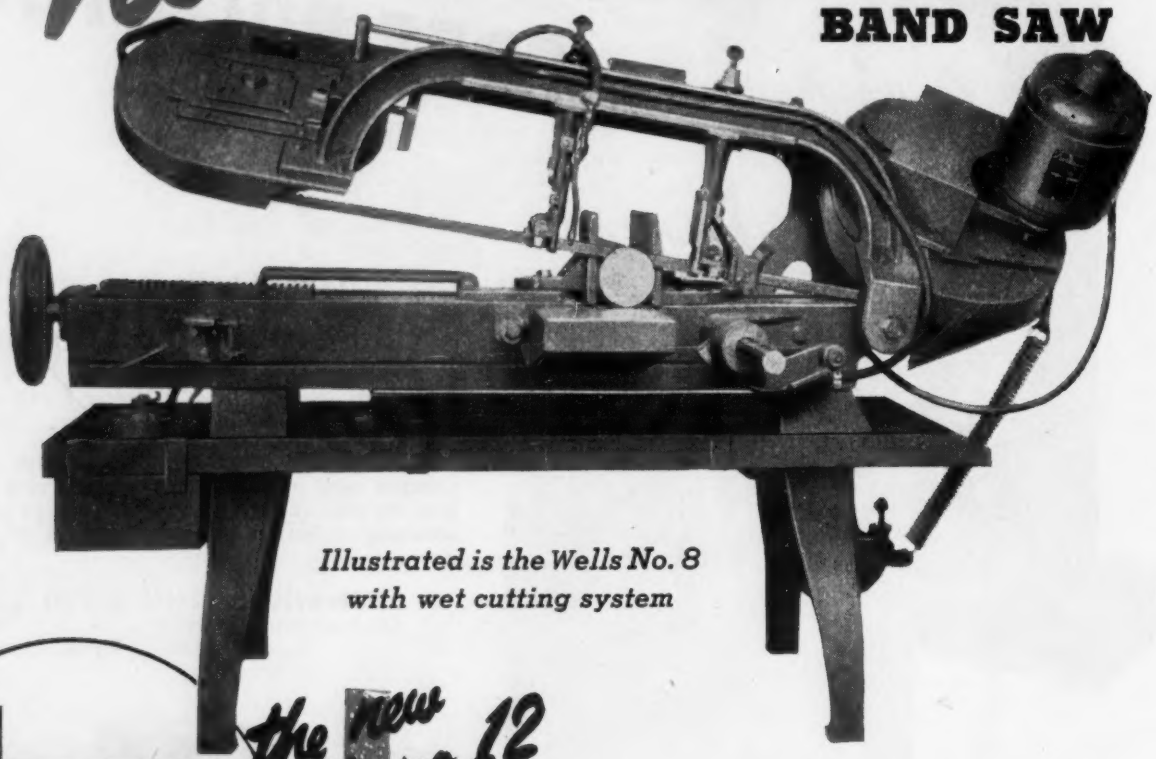
Are you *thoroughly* familiar with what the centrifugal process now has to offer? One of these bulletins could well be your tip-off to big new savings and performance advantages. Write today. We'll send all three bulletins if you wish.

SHENANGO-PENN MOLD COMPANY
470 West Third Street • Dover, Ohio
Executive Offices: Pittsburgh, Pa.

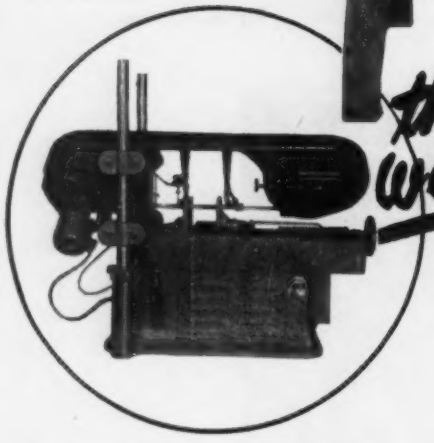
ALL BRONZES • MONEL METAL • ALLOY IRONS

there is

no Lost Time when you cut with a WELLS METAL CUTTING BAND SAW



Illustrated is the Wells No. 8 with wet cutting system



the new Wells no 12

The revolutionary new Wells No. 12 features an automatic hydraulically controlled cutting cycle and controlled blade pressure. It will handle rectangular shapes up to 12″ x 16″ and rounds to 12¾″ O.D. It operates at selective speeds of 60, 90 and 150 feet per minute.

You'll get the job done faster with a Wells Band Saw because the cutting action is continuous. There is no wasted motion. Service records in hundreds of leading plants prove that Well Saws reduce cutting time, yet they are versatile and economical. Ask your dealer for a demonstration or write direct.

Specifications—Wells No. 8

CAPACITY:	
Rectangular	8″ x 16″
Special Guides	5″ x 24″
Rounds	8″ O. D.
MOTOR	½ H.P., A.C. or D.C.
SPEEDS	Selective; 60, 90, 130 feet per minute
WEIGHT	Approximately 665 pounds

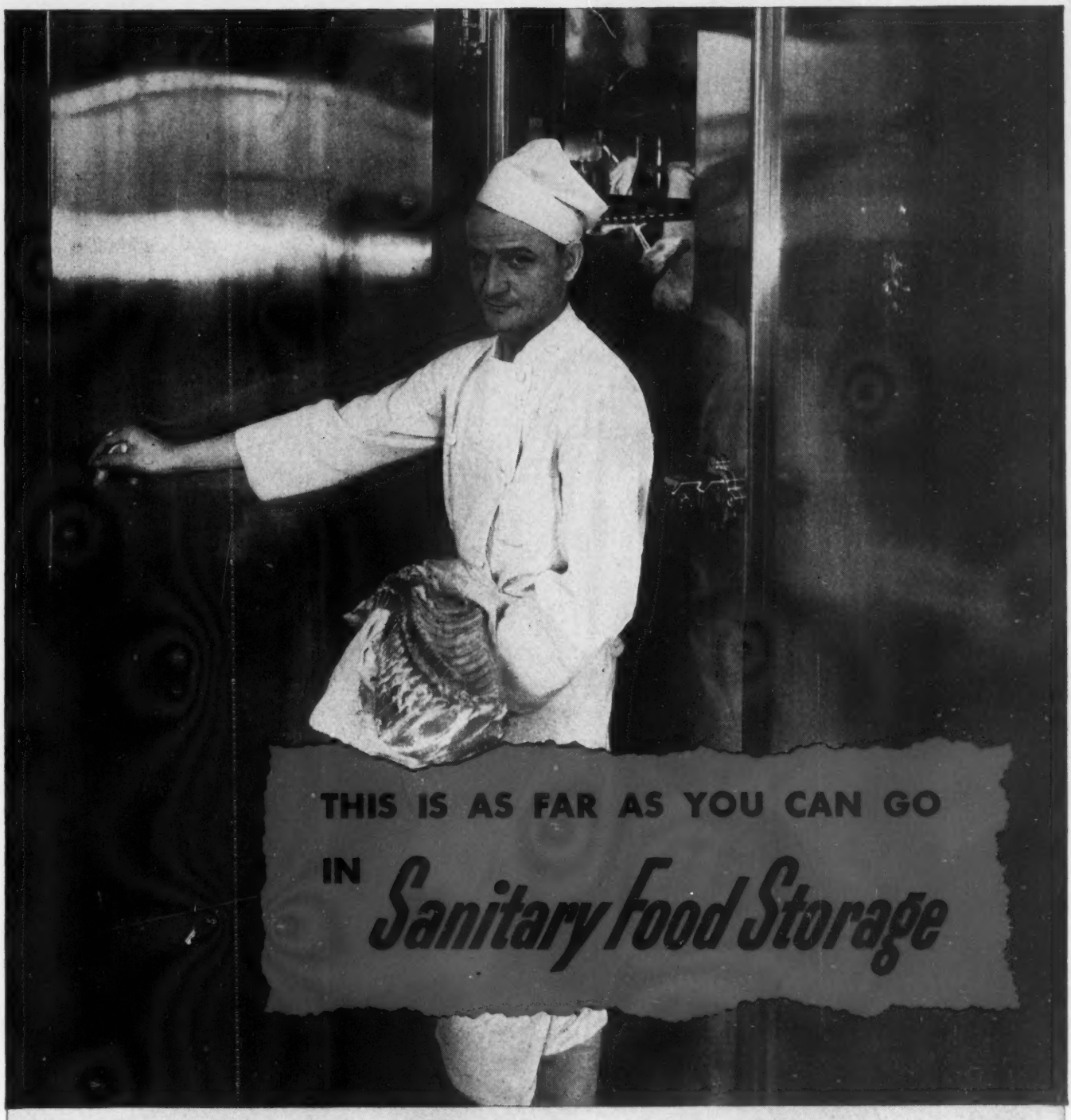
Wells SAWS

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN



You just can't provide better protection for any food than to process it, store it, or cook and serve it in stainless steel. That's why you find so much equipment made of Allegheny Metal, America's pioneer stainless steel, in hospital and hotel kitchens, food plants and restaurants everywhere.

The bright, hard surface of Allegheny Metal is extra-easy to clean and keep clean—and its remarkable corrosion resistance combines with great strength and endurance to provide a lifetime of beauty and sanitary service. If product purity and sanitation are important factors in your business—whether or not it has anything to do with food—you owe it to yourself to learn more about Allegheny Metal . . . its ease of fabrication . . . its long-term economy. ● Let our technicians show you just how far you *can* go in getting better service from equipment by making it of Allegheny Metal. It's available *now*—call for an Allegheny Ludlum Engineer.

ALLEGHENY LUDLUM STEEL CORPORATION Pittsburgh, Pa.

AL

PIONEER IN SPECIALLOY STEELS

ALLEGHENY METAL is stocked by all **JOS. T. RYERSON & SON, INC.** Warehouses

W&D 1245-C

Thousands
Sureweld
ELECTRODES

s can't be wrong...

To Be Sure, Say Sureweld

When a product is first choice consistently —year after year—with thousands of satisfied users—it *must* be a product of unusual merit. Sureweld users say Sureweld electrodes rate ace-high with them because of Sureweld's "reliably uniform performance".

Regardless of job to be done, they say, Sureweld electrodes rank tops for bead appearance, speed and easy operation, ease of slag removal and amazingly low spatter loss. They say, "Sure, Sureweld does it better, faster, easier—every time".

It's not at all surprising that Sureweld rods have a reputation for consistently superior performance. They're produced by one of the world's largest and most efficient electrode manufacturing plants. The high-speed, high-precision equipment that makes them has no counterpart in the industry. And *four* separate and complete laboratories safeguard their unvarying high quality.

Yes, 30 years of growing up with *both* flame and electric arc welding, authenticate every characteristic of Sureweld electrodes. And this same broad experience can be brought to bear on *your* welding problems by sage, seasoned NCG technical counsel. It's yours for the asking.

Next time—To be sure, say Sureweld! Quick, fresh supply *for you* is insured from a vast network of hundreds of independent NCG distributors and warehouse stocks.

NATIONAL CYLINDER GAS COMPANY
HOLLUP DIVISION
840 North Michigan Avenue, Chicago 11, Illinois

(Copyright 1947 by National Cylinder Gas Company)

NCG
EVERYTHING FOR WELDING

NCG is recognized as one of the largest organizations of its kind in the world. It operates 73 manufacturing plants within the United States, offers supply and service by a vast network of hundreds of independent NCG distributors and warehouse stocks. For assured satisfaction in *your* welding and cutting needs . . .

RELY ON NCG

TONCAN IRON

Stays on the Job Longer

Long, trouble-free life is a natural characteristic of every sheet metal part made of Toncan Iron. And not without good reason, too.

Toncan Iron contains extra copper—twice as much as copper-bearing steel or iron—*plus* molybdenum, to bring out the full effectiveness of the copper. Thus, *Toncan Iron develops the highest rust-resistance of all ferrous materials in its price class*—lasts years longer than less resistant materials.

Add the fact that this rust-resistance is not just a surface quality, but extends uniformly throughout the metal—is unaffected by bending, shearing, punching, corrugating, riveting and other cold working—and it's easy to understand why cost-wise sheet metal men, for nearly 40 years, have made it a point always to specify Toncan Iron. Important, too, Toncan Iron welds readily.

Like more information? Write to:

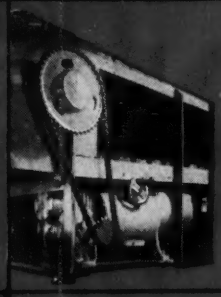
REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic
REPUBLIC STEEL
TONCAN COPPER MOLYBDENUM IRON

—for these parts of your product and for these sheet metal applications in your plant where low-cost resistance to rust is needed—and for corrugated metal drainage products

FOR WIDE RANGE OF WORK

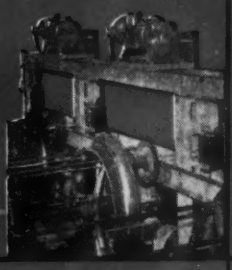
FOR CHANGES IN VISCOSITY



REGULATES CONVEYOR SPEEDS

FOR CHANGES IN DIAMETER

FOR CHANGES IN TEMPERATURE

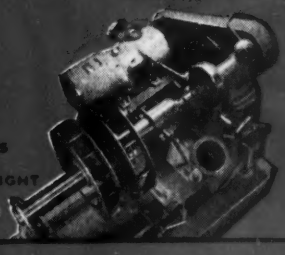


MAINTAINS CONSTANT TENSION

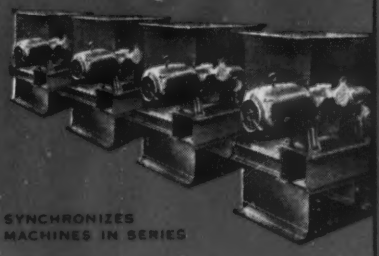
MAINTAINS LINEAL SPEEDS

FOR CORRECT POSITIONING

CHANGES PERIPHERAL SPEED

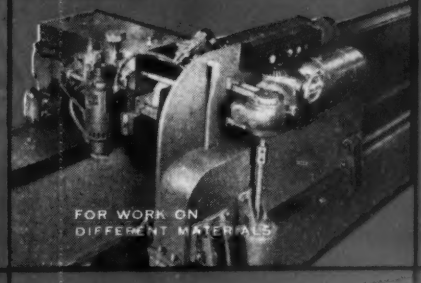


CHANGES IN SIZE AND WEIGHT

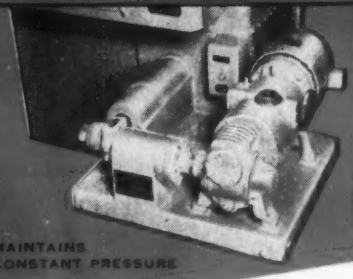


SYNCHRONIZES MACHINES IN SERIES

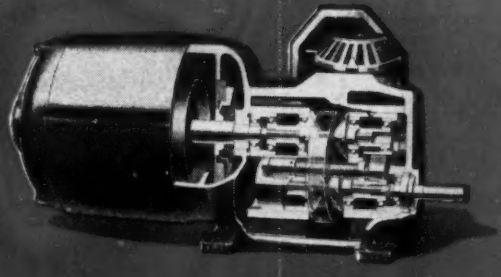
TEXTILE MACHINERY



FOR WORK ON DIFFERENT MATERIALS



MAINTAINS CONSTANT PRESSURE



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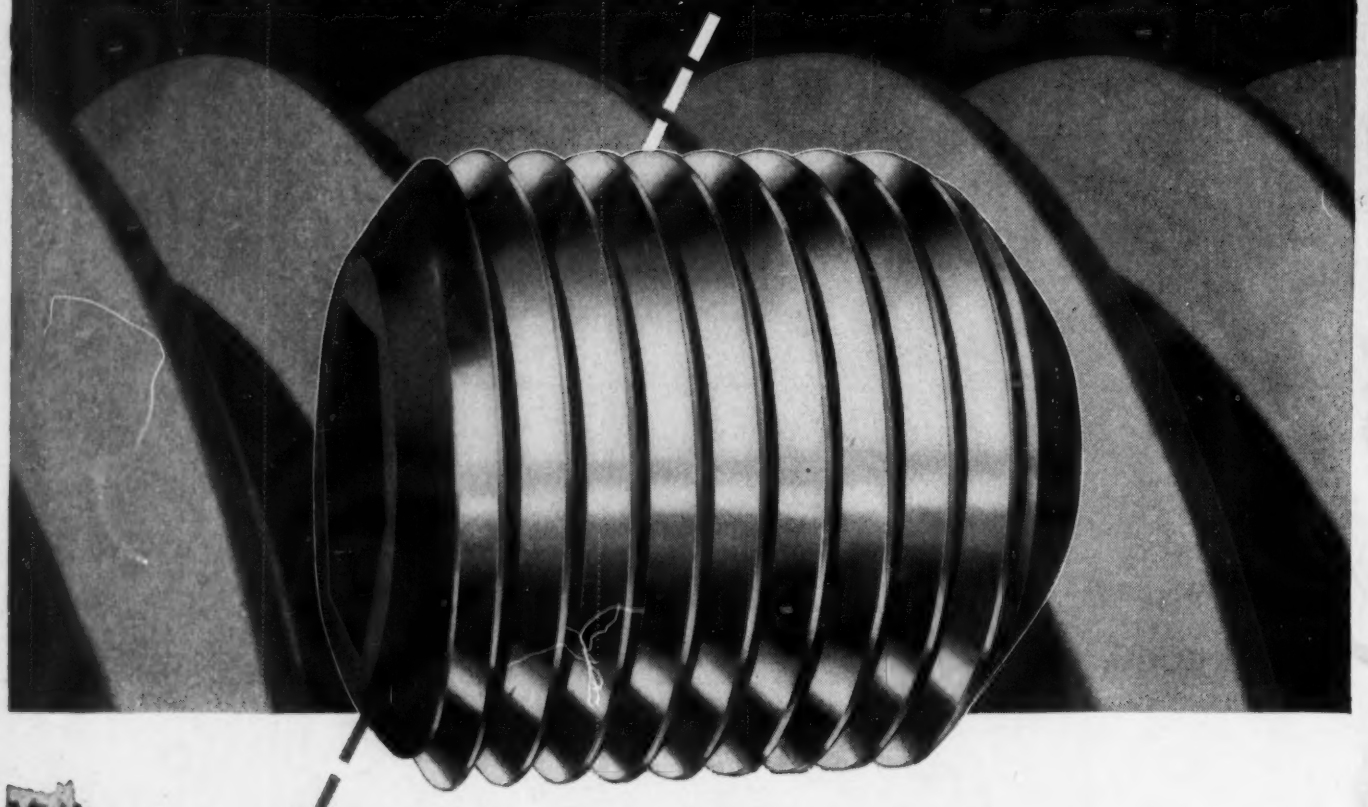

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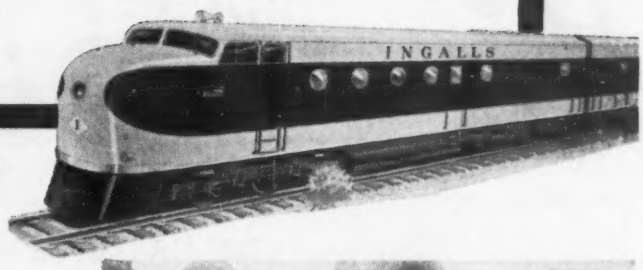

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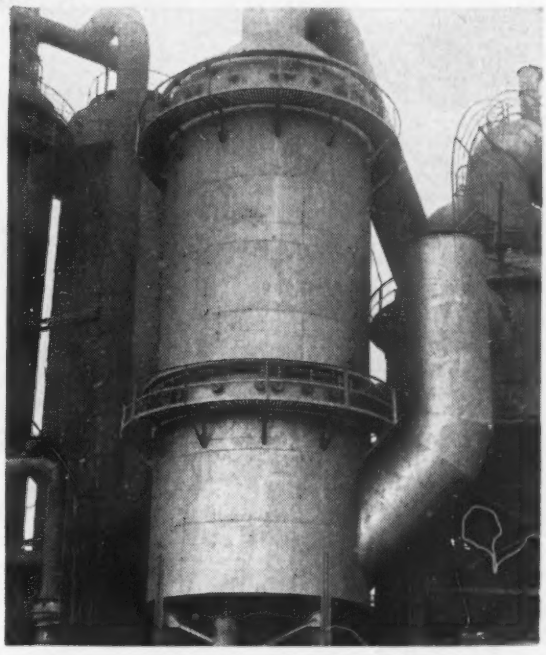

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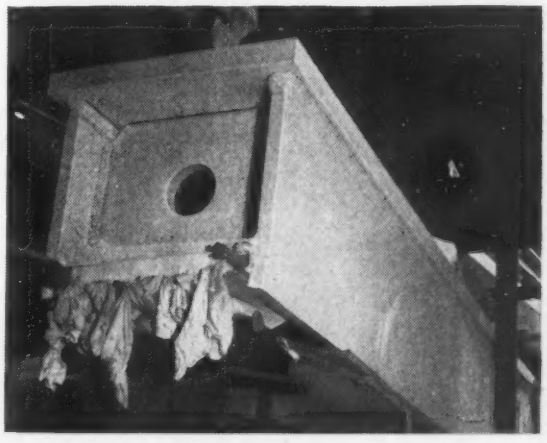

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Illustration of

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A toy pistol sand cast

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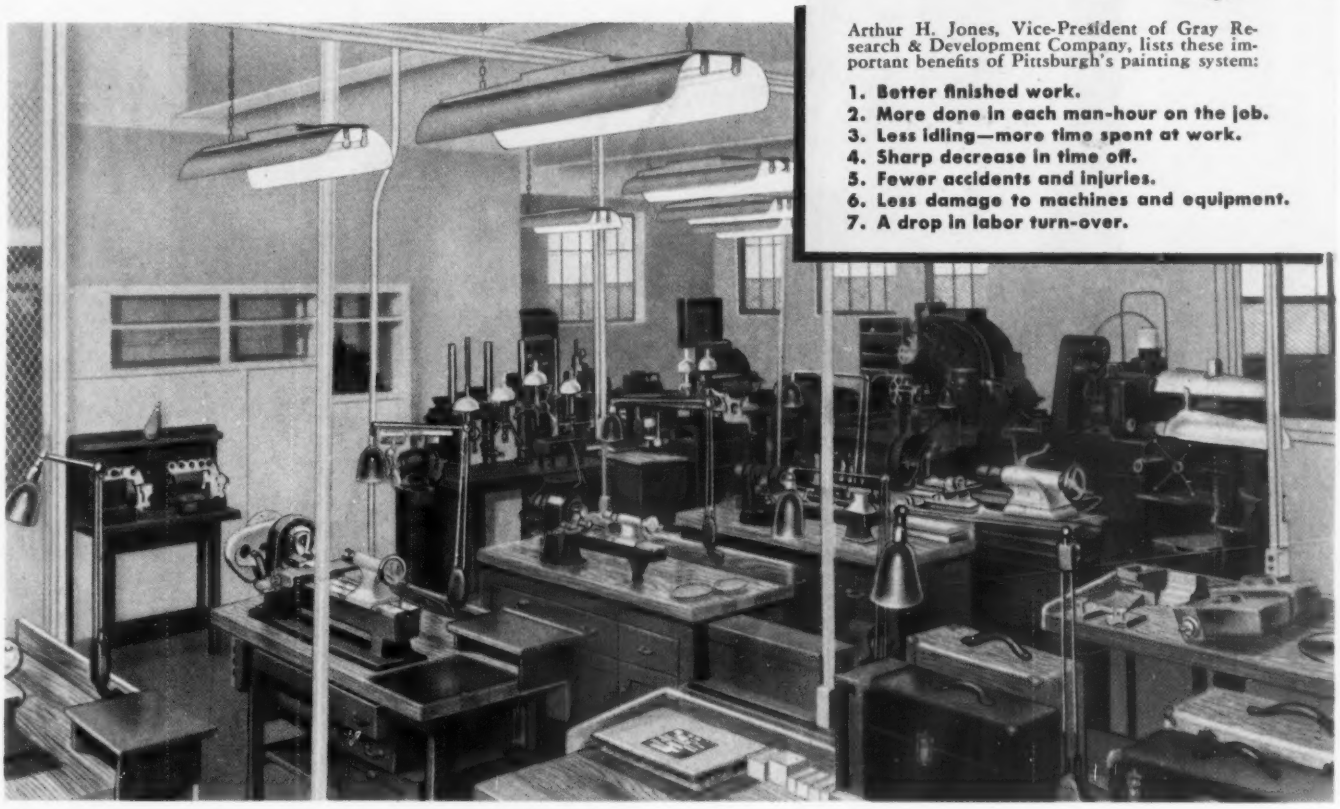
. . . adds to efficiency of all types of workers in Gray Research Plant!



Arthur H. Jones, Vice-President of Gray Research & Development Company, lists these important benefits of Pittsburgh's painting system:

1. **Better finished work.**
2. **More done in each man-hour on the job.**
3. **Less idling—more time spent at work.**
4. **Sharp decrease in time off.**
5. **Fewer accidents and injuries.**
6. **Less damage to machines and equipment.**
7. **A drop in labor turn-over.**

EXPERIENCE of the Gray Research & Development Company of Elmsford, N. Y., is further proof of the fact that workers of all kinds are benefited by the use of Pittsburgh's COLOR DYNAMICS. Efficiency and productivity of office employees, scientists and technicians as well as production workers of this unusual organization are increased and their morale improved.

Gray has long been prominent for its advancements in sound recording and reproduction which are replacing existing equipment in many fields.

Gray's decision to apply COLOR DYNAMICS was made after careful study of the influence of the *energy in color* upon human beings. How this system of painting has improved output and working conditions is best described by Arthur H. Jones, Vice-President of this company.

"Once we became convinced," writes Mr. Jones, "of the soundness of the principles of Pittsburgh's system of COLOR DYNAMICS, we decided to use it throughout our entire plant.

"Because of our delicate equipment, intricate fabricating and critical testing operations, the big question was whether COLOR DYNAMICS could improve production. Double contrast colors on our machines have helped to focus attention of workers on their tasks, reducing eye strain and physical fatigue. This functional use of color has had a stimulating effect. The workers have reflected this improvement in their behavior as well as in increased productivity."

Why not investigate now what COLOR DYNAMICS can do in your plant? Send for FREE copy of our new and enlarged booklet which explains this new painting system and how to use it. Pittsburgh Plate Glass Co., Paint Division, ST-127, Pittsburgh, Pa.

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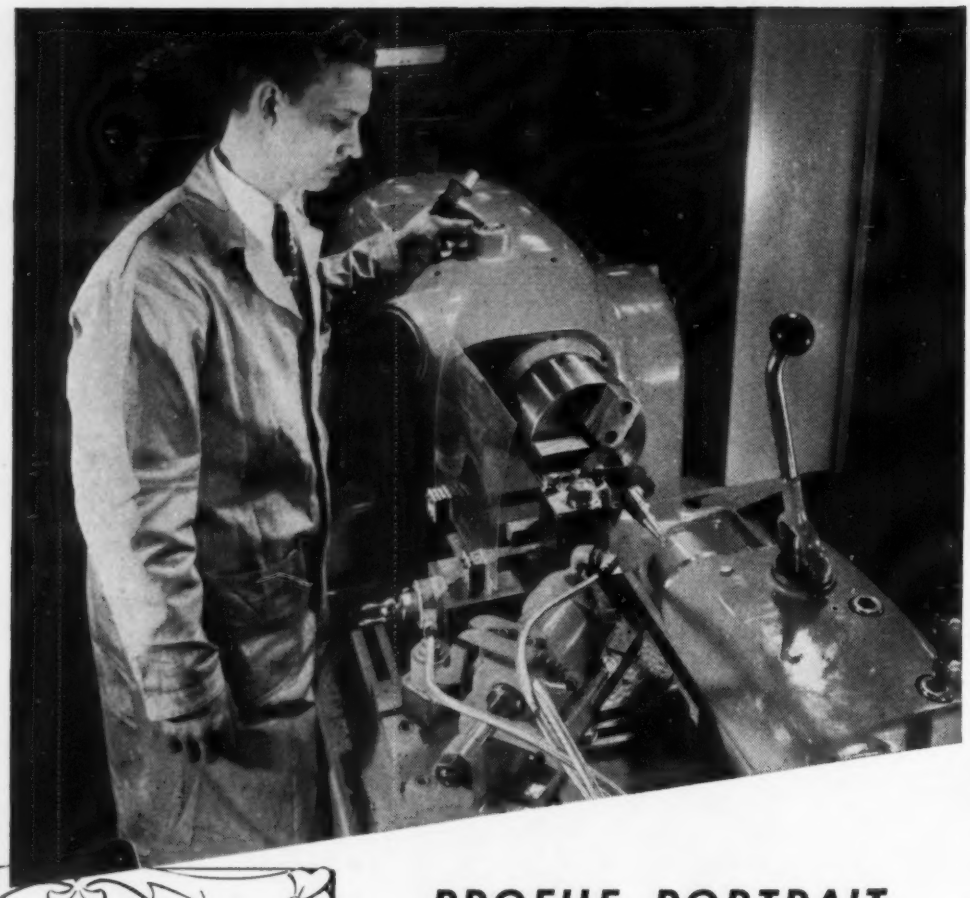
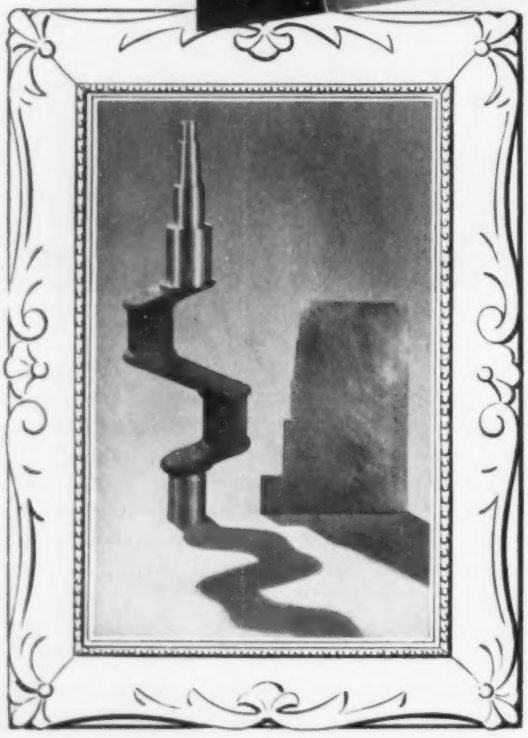
PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS





PROFILE PORTRAIT OF PRODUCTION

Floor-to-Floor Time—24 Seconds!

(Former Machining Time, on Multiple Tool Automatic—40 Seconds)

Here's a 10¾″ compressor crankshaft machined within limits of .0005″ maximum error on all diameters—as proved on a 2,000 lot run.

That's the Monarch way to "*peak production at a profit*".

The machine that makes this outstanding record is a 2,000 rpm Monarch Uni-Matic, equipped with the new Air-Gage-Tracer Uni-Mat—just announced at the Machine Tool Show.

With this Uni-Matic you'll get not only greater accuracy and increased production—you'll get finished parts at a fraction of the former tool cost—and with substantially less down time.

On this job, tool change, necessary only after 350-400 pieces, requires less than one minute.

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Fabricating Steel Hardware

Waste Pickle Liquor Studies

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 24 DECEMBER 15, 1947

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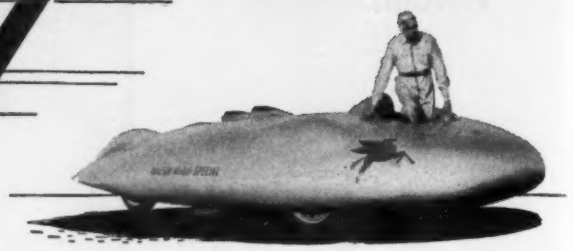
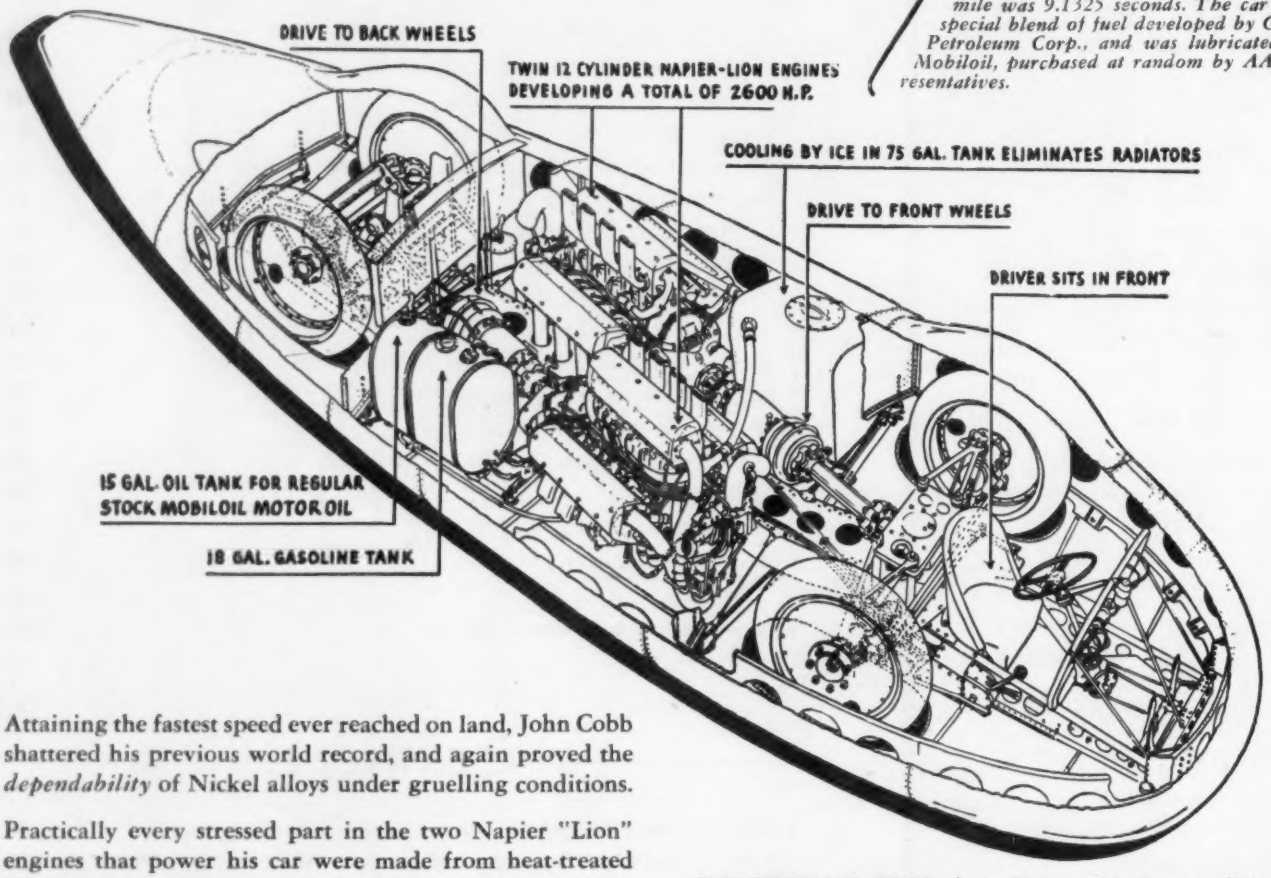
400 MPH

WITH THE HELP OF

NICKEL ALLOYS...



John Cobb drove this "Railton Mobil Special" over the measured mile on the Bonneville Salt Flats in 8.93 seconds . . . a speed exceeding 403 miles per hour. His average time for the mile was 9.1325 seconds. The car used a special blend of fuel developed by General Petroleum Corp., and was lubricated with Mobiloil, purchased at random by AAA representatives.


DRIVE TO BACK WHEELS
TWIN 12 CYLINDER NAPIER-LION ENGINES DEVELOPING A TOTAL OF 2600 H.P.
COOLING BY ICE IN 75 GAL. TANK ELIMINATES RADIATORS
DRIVE TO FRONT WHEELS
DRIVER SITS IN FRONT
15 GAL. OIL TANK FOR REGULAR STOCK MOBILOIL MOTOR OIL
18 GAL. GASOLINE TANK

Attaining the fastest speed ever reached on land, John Cobb shattered his previous world record, and again proved the *dependability* of Nickel alloys under gruelling conditions.

Practically every stressed part in the two Napier "Lion" engines that power his car were made from heat-treated Nickel alloy steels.

ALL PINIONS, GEARS AND SHAFTS in the differential and transmission, supplied by Firth-Derihon Stamping, Ltd., were made from an electric furnace Nickel-chromium casehardening steel, containing 4.3 percent Nickel.

THE UNIQUE UNIVERSAL JOINTS made for this car by Laycock Engineering Co., utilize a 3½ percent Nickel steel spline shaft joined to the housing with bolts of the same Nickel content.

THE SPEEDSTER'S FRAME was produced by John Thompson Motor Pressings, Ltd., in Nickel alloyed steel with a minimum tensile strength of 100,000 p.s.i.

THE STEERING GEAR, from Burman & Sons, utilizes two Nickel steels and one Nickel-chromium-molybdenum steel, heat treated to high strength and toughness.

WHEELS FOR THIS CAR are the same ones made by Dunlop Rim & Wheel Co., Ltd., for Cobb's 1939 record run. They incorporate rims produced from forged rings of a 3½ percent Nickel steel and held together on each wheel by bolts of "18-2" stainless steel, heat treated prior to machining.

Nickel alloys have established notable records in exacting applications. The many compositions available permit selecting the one with extra qualities for a specific use. Discuss your individual metal problems with our technical staff. Write us today.

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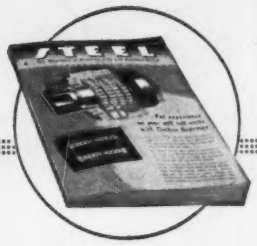


December 15, 1947

Harrowing Experience

This writer has had an experience which, if it could have been shared by all American industrialists, would have been exceedingly revealing to them.

At the request of an industrial executive, we agreed to participate in a conference on "America's Responsibility for World Peace." There were four principal speakers. One was a noted historian, another a well-known professor of economics and a third an expert on Russia. As the fourth, we were to speak for business. Later on, we learned we had been invited after several spokesmen for business had declined because of the leftish complexion of the speaking cast.

The large audience consisted of intelligent individuals who in most respects would rate well above the average of American "middle class." As the program unfolded, we were shocked at the casual manner in which our three colleagues and an overwhelming majority of the audience assumed that business was always wrong. Time and time again questions were phrased in terms which indicated the questioner was blindly prejudiced against business. The National Association of Manufacturers was openly ridiculed at least a dozen times.

At the closing session each speaker was given a minute to summarize his impression. We used our minute to say that most members of the audience were misinformed about business, that this probably was the fault of business, that members of the audience cannot hope to work effectively for any constructive objective as long as they hold such fallacious ideas about business and that a better understanding of business should stand high in the agenda of future meetings.

This brought forth the first spontaneous applause for the business viewpoint in the entire meeting. Afterwards a few persons came up to say "We are on your side."

The question uppermost in our mind—and one that should be troubling every industrialist—is this: Why do intelligent persons, many of whom derive their income directly from business, when assembled in a study group of this kind, consider it smart and fashionable to approve every leftish statement and to condemn or ridicule the voice of business regardless of merit?

This experience, plus others, makes us fear that industry's public relations still are in the infancy stage.

* * *

PIG IRON SHORTAGE: In order to provide a clear outline of the pig iron shortage, the editors of this publication obtained confidential reports from 82 foundries representing a cross section of the industry, and from pig iron producers.

From this information it is apparent that while about the same percentage of total pig iron production is being allotted to foundries now as in 1941, less than 20 per cent of the foundries have received their full requirements of iron so far this year.

Of the 82 castings plants reporting, 14 are receiving 100 per cent of requirements, 35 are receiving from 70 to 99 per cent of requirements, 16 are receiving 50 to 69 per cent, 2 are receiving less than 50 per cent, 9 have gone into production since 1941, 3 are using all scrap and 3 have gone out of business.

The 67 foundries that were in operation in 1941 and are still in business used an average of 18,372 tons per month in 1941 and are now consuming an average of 18,786 tons monthly. However, their current needs average 23,651

(OVER)

tons per month, so that the shortage for these 67 foundries is 4865 tons monthly, or 20.6 per cent.

If the situation were the result of one or two factors, there might be hope for early improvement. However, it is due to a half dozen or more complications, some of which will get worse before they get better. The critical scrap situation, inadequate supplies of suitable coke, operating blast furnaces long overdue for repairs, government subsidies to furnaces to provide iron for housing projects, purchase of blast furnaces to provide iron for owners and affiliates and the ever-present pressure to divert iron to steelmaking requirements all are important factors. —pp. 61, 67

* * *

DIESEL LAB FOR U. S.: At a time when almost every news item relating to reparations deals with plant or equipment earmarked for Russia, it is noteworthy that a world-famous diesel engine research laboratory is to be brought from Germany to the United States.

The laboratory in question is that of Klockner-Humboldt-Deutz at Oberursel. Its work has been concentrated on 2-cycle, loop-scavenging diesel engines which some authorities believe are more efficient than the orthodox American 4-cycle diesels. Major credit for obtaining this laboratory for American use is given to Otis D. Treiber of Hercules Motor Co., who went to Germany under the auspices of the Office of Technical Services, Department of Commerce. OTS will place the laboratory in a suitable American university.

It will be interesting to note to what extent the work of this laboratory under American direction will influence the development of diesel engines in this country in the next decade.

—p. 70

* * *

WHO SHALL QUALIFY? When Congress gets down to brass tacks on the rehabilitation part of the Marshall Plan, there will be long debate as to the qualifications of a recipient country which will entitle it to aid. Already a number of eminent persons have said that aid should be extended only to countries in which freedom of private enterprise is enjoyed.

Assume that this actually became a condition of receiving aid under the Marshall Plan. Machine tool exports from the United States during the first nine months of 1947 included the following, in millions: Russia $14, France $10.7, Canada $7.3, United Kingdom $7, Sweden $6.7, Poland $3.5, China $3.2, Netherlands $3.1, Belgium and Luxemburg $2.9, Yugoslavia $2.2 and Czechoslovakia $1.5.

Most of these countries that are in Europe are in line for aid under the Marshall Plan. In only a few of them does private enterprise enjoy the freedom it enjoys in the United States. The political and economic structure of a nation cannot be changed overnight.

Should we make our aid conditional upon whatever system prevails now or upon the system we hope may prevail when a recipient country is operating on a more normal basis?

—p. 71

* * *

PERENNIAL PROBLEM: It seems odd that our nation, which has demonstrated twice in a generation that it can build and operate ships on a grand scale in time of war, has so much trouble maintaining an adequate merchant marine in time of peace.

Today American shipbuilding is rapidly approaching almost complete inactivity. By early 1948 the only existing contracts for new ships will be for one dredge and four small cargo ships. Meanwhile foreign shipyards are busy.

Maritime Commission estimates we need a fleet of 1044 ships with deadweight of 11,400,000 tons. This compares with an American fleet of 1091 vessels of 9,310,000 tons in 1939.

Can't we find a solution to the perennial problem of the merchant marine? —p. 72

* * *

REMOVING THE BARRIER: American Society of Mechanical Engineers made progress when it arranged for its Machine Design and Production Engineering Divisions to participate in a joint session at the annual meeting.

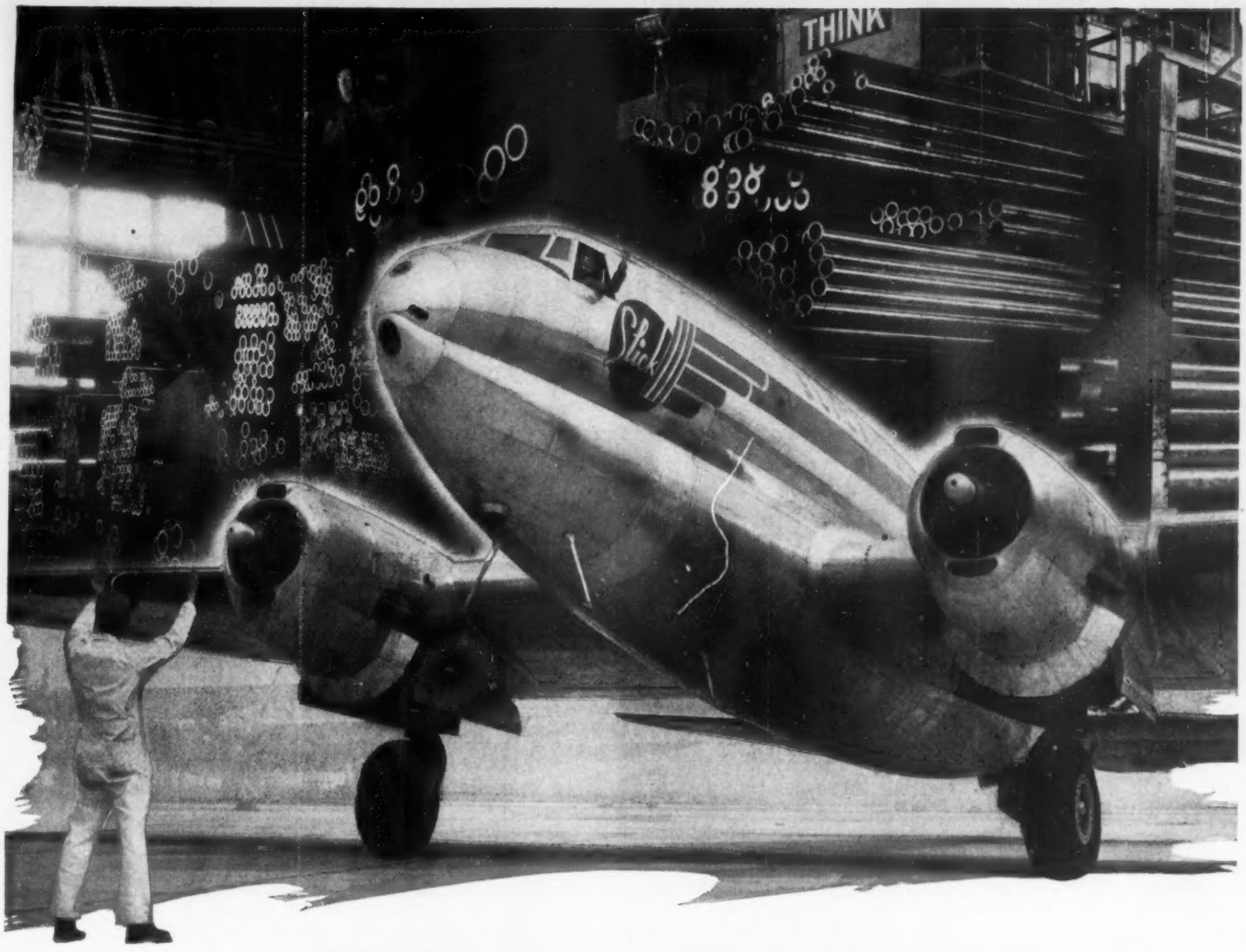
The opening speaker got right down to cases when he said "the artificial barrier which has grown up between engineering departments and production departments has done more than any one thing to retard the continual reduction of costs which is so essential to profitable manufacture."

Reconciling the differences between design and production men is making more headway than appears on the surface. More sessions like that of ASME will help appreciably.

—p. 92

E. L. Shaner

EDITOR-IN-CHIEF



Taking the Distance Out of Your Steel Problems

Urgently needed by a Los Angeles engineering company, was a large shipment of stainless steel pipe in a special size. A call to the Ryerson plant in Los Angeles disclosed that the required pipe was not in Los Angeles stock, but *was* on hand in another city.

Ryerson Los Angeles immediately phoned Ryerson in Chicago. Could Chicago supply the desperately needed pipe? Chicago could—and did! The material was quickly trucked to a Chicago airport, flown to Los Angeles, and delivered at the customer's plant the following morning, less than 24 hours after the order was received.

That's how Ryerson—when the steel *is* available—can take the *distance* out of your steel problems. That's how the twelve closely cooperating plants of the Ryerson Steel-Service System often accomplish the seemingly impossible in an incredibly short time. And that's the sort of far-reaching service you can look for when you contact any Ryerson plant for any steel requirement.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

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Bars—hot and cold rolled	Mechanical Tubing	Tool Steel
alloy steel	Boiler Tubes and Fittings	Wire, Chain
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Structurals	sheets, plates, shapes,	Babbitt
Plates—	bars, tubing, etc.	Metal Working Tools
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RYERSON STEEL

FIVE Advantages of Inland HI-STEEL

The low alloy, high strength steel

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In contrast with ordinary structural steel, Inland Hi-Steel has nearly twice the yield strength, the same elongation, and almost 50% higher fatigue strength. With Hi-Steel, designers can increase strength without resorting to excessive weight and size of parts. On mobile units, Hi-Steel increases payload without sacrificing strength.

2 GREATER CORROSION RESISTANCE

Hi-Steel has more than twice the atmospheric corrosion resistance of copper-bearing steel and about five times that of ordinary structural steel. When its bare surface is exposed for a long period, the elements in it contribute to the production of a dense adherent rust which acts as a protective coating and greatly retards further corrosion.

3 MORE RESISTANT TO ABRASION

In resistance to abrasion, Hi-Steel is far superior to copper-bearing and ordinary structural steels. Coal companies and other bulk material producers use Hi-Steel in chutes, screens, and bunkers because of its long life. Where both abrasion and atmospheric corrosion are combined, Hi-Steel will outlast many "abrasion-resistant" steels.

4 EASY TO WORK

Because of its high ductility, Hi-Steel can be worked either hot or cold with little or no deviation from standard shop practice. It does not normally require heat treatment to retain or to restore its normal properties after working. Hi-Steel can also be flame cut as easily as ordinary structural steel, and can be welded by conventional methods.

5 LOW IN COST

The price per pound of Inland Hi-Steel is only moderately higher than ordinary structural steel. However, where a given strength is desired, sections of Hi-Steel can be made lighter, so the total cost of steel is frequently not increased. On mobile equipment, this weight saving quickly pays for the small difference in price by an increase in payload.

HI-STEEL meets the requirements of SAE Specification 950

Hi-Steel is rolled in structural sections, bars, plates, strip, and sheets. While the supply is limited, every effort is being made to bring you Hi-Steel in greater quantities.

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News Summary

CONTROLS—Battle over price, distribution and wage controls will be carried over to the regular session of Congress starting in January (p. 60). The Republican majority at the moment is not minded to grant the administration's request for blanket authority to impose such controls, even on a "limited" or "selective" basis. Congressional leaders are formulating an anti-inflation program of their own which will stress voluntary co-operation in allocating materials and credit controls to replace the proposed price and wage ceilings.

ACQUIRES OWN STEEL SOURCE—Hudson Motor Car Co. has joined the ranks of steel users insuring their own supply by leasing a major portion of the Shenango tin plate plant at New Castle, Pa. Equipment has been obtained and company expects to be producing auto sheets within three months (p. 60). Only a few days ago, Studebaker announced plans to purchase Empire Steel Corp. at Mansfield, O., and since the war a half dozen small steel facilities have been taken over by steel consuming interests. Several more deals are now in the rumor stage.

PIG IRON SHORTAGE—Less than 20 per cent of the 3500 ferrous foundries are receiving their full requirements of pig iron, resulting in part-time operations, makeshifts in operating practices and unsatisfied customers. These foundries report to STEEL (p. 61) they need 26 per cent more iron than they are getting, but expect the supply situation to become worse before it improves.

INFLATION WINS—Last March, International Harvester Co. in a brave attempt to halt the rising tide of inflation announced price reductions aggregating $20 million annually in the face of rising wages, materials and transportation costs. Similar action had been taken a few weeks earlier by Ford Motor Co. in announcing reductions of $15 to $50 per car. But wages, materials and transportation costs continued to rise and last week IHC bowed to inflation, raised its prices an average of 5 per cent.

SCRAP FROM CHINA—Bethlehem Steel Co. has purchased one million tons of unprepared scrap from the Chinese government for $30 million, including $18 million transportation charges (p. 161). First shipments will arrive at Baltimore in January.

SALES TRAINING—Simonds Saw & Steel Co. introduces a novel sales training laboratory (p. 78) in a replica of a typical New England "Little Red School House" enclosed in its Fitchburg, Mass., plant. Scale models of Simonds wood and metalworking machines are arranged, equipped, tooled and manned just as they would be on the job. School will be used to train salesmen of Simonds and its distributors.

EUROPE GAINS—Moderate improvement is being recorded in the industrial output of many of the countries to benefit under the foreign aid program (p. 73). Britain now expects to exceed her steel production goal of 12.5 million tons this year and for 1948 hopes to have 14,750,000 tons. This would give domestic consumers 40 per cent more steel than they used in 1938. Despite damaging strikes, French output generally is above 1939 and shows marked gains over 1946. Belgium and Luxemburg are blowing in additional blast furnaces.

SIGNS OF THE TIMES Ingersoll, the prewar "dollar watch", will soon be back on the market, but the price will be $2.50. . . . October steel payrolls established a new monthly record at more than $180 million, almost triple the average monthly payroll of 1939. . . . All is not smooth sailing at the Havana trade conference where less industrialized nations are objecting to lowering or elimination of import quotas and tariffs (p. 68). . . . Machine tool exports have been declining during 1947 (p. 71), largely as result of lower shipments to Russia.

Sheet Buyers Seeking Mills

Metalworking firms give increasing attention to acquisition of own steel plants. Hudson Motor leases plant to produce own sheets. Six other deals reported pending

SEVERE shortage of sheet steel is causing metalworking firms to direct increased attention to the possibility of solving their supply problem by engaging in sheet production on their own.

Over the past year or so several nonintegrated sheet mills have been acquired by metalworking firms or syndicates, and within recent weeks the movement has received new impetus. Currently, it is said, at least six manufacturers are seeking to acquire steel mills or plant buildings that can be accommodated to sheet production.

Hudson Leases Plant—Last week Hudson Motor Car Co., Detroit, leased two-thirds of the former Shenango tin plate plant of Carnegie-Illinois Steel Corp. at New Castle, Pa., and plans to produce sheets for auto bodies at the rate of 10,000 tons monthly beginning second quarter of next year.

Comment Refused — Officials of Hudson up to press time refused to make any comment on reports the company had leased space in the plant. Hudson, it is said, will occupy 426,000 sq ft.

Presumably equipment installations will include breakdown, roughing and finishing roll stands for processing sheet bar into hot-rolled sheet packs, as well as facilities for pickling, handling and packaging. Both 2-high and 3-high mills are included, it is said.

An outside source for sheet bar obviously will be needed to supply the New Castle operation. Hudson for the past 18 months has been purchasing ingots from a Detroit mill on a scrap conversion basis. This mill, an electric furnace plant, does not have equipment for rolling sheet bars, but it might be possible to modify rolling techniques to produce such material.

Assemblies of Hudson cars currently are running close to 300 daily and will be stepped up to around 550 daily by next month. Sights are being drawn on an output of 1000 a day.

The Shenango plant, which is owned by the government, was said to have been leased by Hudson for a period of 4 to 5 years at a rental of $110,000 a year with option of renewal. The plant is huge, providing 625,000 sq ft of floor space. It once was said to be the largest tin plate plant in the world under one roof. With the advent of the continuous mill, however, the works became obsolete and after 1938 was dismantled. During the war it was occupied by the Aluminum Co. of America.

The Hudson move follows quickly upon that of the Studebaker Corp., South Bend, Ind., which, it became known recently, plans to take over the Empire Steel Corp., at Mansfield, O.

Others Acquire Plants—Within the past year or so General Electric Co. has acquired the Mahoning Valley Steel Co. at Niles, O., International Detrola Corp., Detroit, has acquired the former Newport Rolling Mill Co., the Borg-Warner Corp. has taken over the Superior Sheet Steel Co. at Canton, O., a syndicate of manufacturers has acquired the Apollo Steel Co. at Apollo, Pa., and the Phoenix Iron Co. at Phoenixville, Pa. Also, the Barium Steel Corp., holding company for a group of manufacturing divisions, has acquired the Central Steel Co. at Harrisburg, Pa., and the Kaiser-Frazer Co. has acquired a sheet mill at Indianapolis from the Continental Steel Corp., leased a blast furnace of the Struthers Iron & Steel Co. at Struthers, O., and arranged a connection with the Portsmouth Steel Corp., Portsmouth, O.

Currently, the Kaiser interests are reported dickering for another sheet mill, the identity of which is not known. Also Kaiser is reported negotiating with the government for a blast furnace at Chester, Pa., though the Phoenix-Apollo interests are also reported seeking this stack.

More Deals Reported—While it is reported six other automotive and general manufacturing companies

(*Please turn to page* 162)

Steel Production Sets November Peacetime High

Steel production during November totaled 7,249,523 net tons of ingots and steel for castings, bringing the total for the first 11 months to 77,434,423 net tons, according to the American Iron & Steel Institute. This was about 25 million more tons than were produced in all of 1939, and almost 11 million tons above total output in 1946.

November production is the highest ever attained during that month in peacetime. November steel operations averaged 96.6 per cent of capacity, as compared with 97.5 per cent in the previous month and 85.4 per cent for the November, 1946, month. November output included 6,550,897 net tons produced in the industry's open hearths, which operated on the average of 98.3 per cent of capacity; 360,620 net tons produced by bessemer furnaces, operating at an average rate of 85.0 per cent; and 338,006 net tons turned out by electric furnaces, which averaged 80.9 per cent of capacity during the month.

Revised October production amounted to 7,560,365 net tons, of which 6,826,548 net tons comprised open hearth steel, 384,272 net tons represented Bessemer steel, and 349,545 net tons were made in electric furnaces.

Action on Controls Deferred

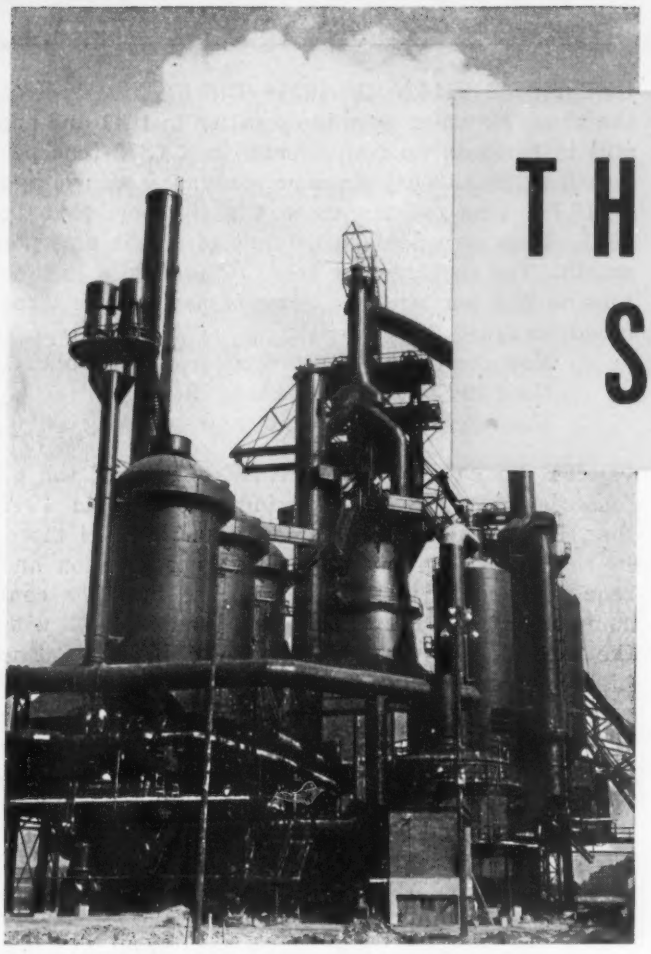
PROSPECTS that Congress will grant the administration's request for standby wage and price controls and rationing power over iron, steel and other basic commodities have faded into the background.

Nor does it appear likely that these portions of the President's anti-inflation program will be approved at the regular session starting in January.

Instead the Republican majority will ask passage this week of substitute legislation. This will provide for an expanded export control plan, transportation controls and will permit voluntary industry-wide agreements on allocations and prices without incurring liabilities under the antitrust laws. The latter measure would provide funds for the administration to promote voluntary cooperative programs to hold down the cost of living. Further anti-inflation measures are expected to be taken at the regular session in January.

Harriman asks Controls — Meanwhile, the administration continues to press for approval of the President's program. Secretary of Commerce W. A. Harriman, the administration's chief spokesman on Capitol Hill for allocation and inventory controls, urged their adoption before a subcommittee of the Senate

(*Please turn to page* 163)



THE PIG IRON SHORTAGE

Foundries face shutdowns and short time although furnaces make about same proportion of foundry and malleable iron as in 1941. Less than 20 per cent are getting full requirements

OF ALL the material shortages since the beginning of the war, none has had more far-reaching effects than that of pig iron.

While about the same percentage of total pig iron production is being allotted to foundries as in 1941, reports from across the nation indicate that less than 20 per cent of the foundries have received full requirements so far this year. Foundries expect the situation to get worse before it gets better.

For the bulk of the 3500 ferrous foundries in the United States, therefore, the pig iron shortage means part-time operations, makeshifts in melting practice and pressure from customers for castings.

For the dozen producers of merchant pig iron still in business or not absorbed by major consumers, it means dividing the supply as equitably as possible.

For the integrated steel companies, it also means a battle to keep equipment—much of it long overdue for repairs—in operating condition and a battle in maintaining an adequate supply of high grade coke, as well as the temptation not to sell pig iron to foundries for $36 to $38 a ton and replace it with $45 scrap.

82 FOUNDRIES REPORT—To provide a clearer picture of the situation, STEEL has obtained confidential reports from 82 foundries representing a cross section of the industry, and from pig iron producers.

These foundries report receiving iron from 22 shipping points as follows: Everett, Mass.; Bethlehem, Pa., Swedeland, Pa., Birdsboro, Pa.; Troy, N. Y.; Buffalo; Erie, Pa.; Sharpsville, Pa., Neville Island, Pa.; Pittsburgh; Cleveland; Detroit; Toledo; Gary, Ind.; Chicago; South Chicago; Jackson, O.; Granite City, Ill.; Lyles, Tenn.; Duluth; Birmingham; and Minnequa, Colo.

NO CROSS-HAULING—There is no movement of iron which could be justifiably classified as "cross-hauled," although, for example, some iron is being shipped from Chicago district to East St. Louis in the backyard of the Granite City furnaces. Iron is moving into Michigan from a number of points, including Buffalo, Cleveland, Toledo, Detroit and Chicago. An Illinois foundry is being served by both Colorado and Chicago furnaces. Colorado malleable iron also is moving to eastern Pennsylvania at $41.50, plus $19 in freight. Some iron is moving from the Chicago district to Minnesota but most foundries report Duluth as a source.

One foundry is buying on the basis of prices pegged to the scrap market. Others are paying published levels. Out of 82 foundries asked to supply data:

14 are receiving 100% of their requirements
11 are receiving 90 to 99%
11 are receiving 80 to 89%
13 are receiving 70 to 79%
6 are receiving 60 to 69%
10 are receiving 50 to 59%
2 are receiving less than 50%
9 have gone into production since 1941
3 use all scrap
3 have gone out of business

As the Foundries See The Shortage

...**"The more we think about it, the more desperate the situation looks. Various furnaces are going out of blast and the steel companies are demanding more and more hot metal rather than using scrap. We have heard of firms being out as much as 50 per cent of their first quarter pig iron requirements."**

...**"We are now working a 5-day week and also have cut down on our percentage of pig iron in each ton to try to stretch our meager supply of pig iron."**

...**"The situation will be much worse in 1948—judging from preliminary reports."**

...**"We are one of 20 foundries allotted 25 tons out of 500 available from Brooke as a result of their deal of November 1. We have been compelled to run lighter floors because of the shortage of iron; so far we have refused to pay the $52 price demanded for cast scrap. What we do buy is paid for at no higher than $35 per gross ton."**

...**"Our products are farm implements. Pig allotments to soil pipe producers in this district (Alabama) has reduced our pig tonnage 50 per cent from two of our suppliers; third supplier not affected."**

...**"With scrap conditions as they are and have been—we think pig iron producers have done a remarkable job so far—and are greatly obliged as a foundry that we have been taken care of as well as we have."**

...**"We require 2.75-3.00 per cent silicon iron but now have to take anything we can get from 1.75 up."**

...**"Sloss-Sheffield having gone out of this market (St. Louis) has left an unsatisfied demand, resulting in the greater use of scrap and 16 per cent silvery iron in order to produce castings of acceptable quality."**

...**"We are operating 100 per cent with scrap, trying to do a first class job with second rate materials. The whole situation stinks."**

...**"In producing automobile castings, we are getting about 50 per cent of our need. A certain amount of trading is needed to get iron."**

...**"We are receiving 100 per cent of our pig requirements but only for the reason that we use only 10 per cent compared with 20 to 30 per cent previously. We now must use ferrosilicon and ferromanganese in our charges, which we never did before."**

...**"We have to battle for every car and take any analysis. We have taken iron with 0.16 per cent sulphur."**

GET MORE THAN IN 1941—The 67 foundries of the above 82 which were in operation in 1941 and are still in business used an average of 18,372 tons per month in 1941. They are now consuming an average of 18,786 tons per month or slightly more than in 1941. They now need an average of 23,651 tons per month. The shortage for these 67 foundries is 4865 tons or 20.6 per cent. In terms of percentages these foundries are:

Now receiving 2% more pig iron than in 1941
Need 29% more than used in 1941
Need 26% more than they now are using

FORTY USING LESS, 24 MORE—Forty of the 67 foundries have been consuming less iron in 1947 than in 1941, three the same amount and 24 more. In the table on foundry pig iron consumption and requirements, it will be noted that monthly consumption of all groups is lower than in 1941 with the exception of the 70 to 79 per cent group. The high average consumption for 1947 of the 70 to 79 per cent group as compared with 1941 is attributable to two foundries participating in the housing program. One is using 1672 tons monthly this year, against 559 in 1941, yet is receiving only 70 per cent of requirements. The other is using 3525 tons monthly, compared with 1952 in 1941 or 77 per cent of its needs. No extremely large production foundries are included in the tabulation.

The nine foundries not operating in 1941 are using an average of 2659 tons of pig iron monthly and need an average of 3916 tons per month or 47 per cent more. In this group only one small foundry is receiving all iron needed (7 tons). One malleable foundry getting 2200 tons a month, needs 2750.

For the 67 foundries plus the nine foundries not operating in 1941, the combined totals are: Average monthly consumption in 1941—18,372 tons monthly consumption in 1947—21,445 tons; needed per month —27,567 tons; shortage 6122 tons per month or 22.2 per cent.

It is entirely impracticable to estimate the shortage for the entire foundry industry. Nevertheless, the figures are interesting. If foundry and malleable iron production for 1947 totals 5,600,000 tons, based on performance in the first nine months, the indicated shortage amounts to 1,660,000 tons.

FAIR SHARE?—While there is no question that foundries are short of iron, they appear to be getting their fair share in the aggregate on the basis of pure statistics. American Iron & Steel Institute figures show that production of malleable and foundry iron for sale in 1941 amounted to 8.4 per cent of total output of all grades, including basic for steelmaking. In 1945, the percentage was 7.9 per cent. The 9.6 per cent figure for 1946 probably is not representative because of the interruptions in production due to strikes. No figures are available for 1947, but the percentage is estimated to be 8.8 on the basis of production statistics for the first nine months.

The percentage figures, of course, must be viewed in light of the fact that a considerable tonnage is

earmarked for captive foundries or diverted from the open market through special deals.

BLAST FURNACE CAPACITY—Capacity of the nation's 232 coke blast furnaces on Jan. 1, 1947 was 64,674,020 net tons of pig iron and 1,002,700 tons of ferroalloys or 1.5 million tons less than wartime peak capacity of the 245 furnaces available for duty on Jan. 1, 1944. Three of the four charcoal furnaces operating during the war have been abandoned, leaving the stack of the Tennessee Products Corp. at Lyles, Tenn., the sole source for this grade of iron. The famous charcoal furnaces in the hardwood areas of Michigan now are relegated to history just as are the small merchant furnaces which once dotted Virginia and Pennsylvania. Comparative figures on total capacity appear in an accompanying table.

FURNACES ABANDONED — During 1946, 8 furnaces with a total capacity of 1,879,700 tons were abandoned or dismantled. As a partial offset, the Carnegie-Illinois Steel Corp. has two new furnaces under construction at Chicago with a capacity of 520,200 tons. Bethlehem Steel Co. also is building a new furnace at Sparrows Point and some idle furnaces may be returned to the active list. Ford will have a new furnace ready in about a year.

COKE A FACTOR—Poor quality coking coal is reported to be cutting into the production of individual furnaces anywhere from 5 to 20 per cent but despite this the industry has managed to operate at close to 90 per cent of capacity so far this year. Furnacemen have done a remarkable job of keeping equipment operating which under ordinary circumstances would have been long overdue for repairs. Such repairs, however, are inevitable and have aggravated the situation recently. It is understood that serious consideration is being given to revising blast furnace capacities downward to more adequately reflect inadequate, poor quality and non-uniform grades of fuel, for which little improvement is indicated through 1948.

EXPORTS—Movement of pig iron abroad is negligible in terms of prewar figures and is not contributing to any extent to the shortage in this country. In 1941, 578,583 tons were exported compared with 90,968 tons in 1945 and 95,698 tons in 1946. Imports have increased somewhat. In 1941, 3826 tons were brought in from Canada and 7645 tons from India. Canada was the sole source in 1945, providing 21,433 tons. Last year, 1287 tons were imported from Canada, 11,248 tons from Mexico, 1528 tons from the United Kingdom and 28 tons from Sweden for a total of 14,091 tons.

Exports in the first nine months of 1947 were 15,088 tons, of which 7813 went to Belgium and 6254 to Canada. Imports totaled 35,720 tons, of which 20,457 were from Poland. European requests for 200,000 tons of iron under the Marshall plan, including 100,000 for Italy, probably will not be granted.

New England — Eastern Gas & Fuel Associates operate the only blast furnace in New England and it now is the principal source of supply for foundries in those states with the curtailment of shipments from furnaces in the Buffalo area. At full capacity, this furnace produces 176,400 tons annually or a shade less than 15,000 tons a month.

MONTHLY PIG IRON CONSUMPTION AND REQUIREMENTS OF 76 TYPICAL FOUNDRIES

NUMBER OF FOUNDRIES	TONS USED MONTHLY 1941	TONS USED MONTHLY 1947	1947 REQUIREMENTS		MONTHLY SHORTAGE	
			TONS NEEDED	RECEIVED	TONS	PERCENTAGE
14 Foundries Reported 9 Used Less in 1947—4 More—1 Same as 1941	2599	2220	2220	100%	None	None
11 Foundries Reported 6 Used Less in 1947—4 More—1 Same as 1941	1584	1454	1601	90-99%	147	9.2%
11 Foundries Reported 6 Used Less in 1947—4 More—1 Same as 1941	4220	3497	4195	80-89%	698	16.6%
13 Foundries Reported 8 Used Less in 1947—5 More than in 1941	4158	6741	9062	70-79%	2321	25.6%
6 Foundries Reported 3 Used Less in 1947—3 More than in 1941	2123	2018	3122	60-69%	1104	35.4%
10 Foundries Reported 7 Used Less in 1947—3 More than in 1941	3543	2753	3167	50-59%	414	13.1%
2 Foundries Reported 1 Used Less in 1947—1 More than in 1941	145	103	284	Less 50%	181	63.7%
9 Foundries Reported NOT OPERATING IN 1941	None	2659	3916	68.0%	1257	32.1%
Total—76 Typical Foundries	18,372	21,445	27,567	77.8%	6122	22.2%

All Everett production is going to the foundry trade under a mutual co-operative arrangement between the furnace interests and foundries. The price is $45 for the first year and contracts specify that the price will not exceed that of Buffalo by $5 a ton during the life of contracts. New England foundries are better off than average but there is slight chance for additional outside shipments in the near future.

Eastern States — One steelmaker with merchant pig iron capacity, on the basis of performance to date, will increase shipments to foundries this year by 150 per cent as compared with 1941. This however, is quite the exception inasmuch as foundries in Eastern Pennsylvania and New Jersey appear to be worse off than in other areas.

As recently reported, 90 per cent of the 11,000 to 13,000-ton monthly output of the Brooke furnace now goes to Lukens, Warren and Worth. The larger of two blast furnaces operated by the Alan Wood Steel Co. at Swedeland, Pa., down for repairs, is being returned to operation. Bethlehem Steel Co. requires most of its production for its own steelmaking operations. One new blast furnace is being constructed at Sparrows Point, Md., as part of Bethlehem's steelmaking expansion program there.

Reports from Washington indicate that the old Chester, Pa., furnace may be sold shortly inasmuch as negotitations are actively under way. During the war, it was operated by the Pittsburgh Coke & Chemical Co. Coke supply and missing parts are problems to hurdle. It has annual capacity of 130,000 tons.

Buffalo — Foundries served by blast furnaces in the Buffalo area are finding the situation still more acute with the impending withdrawal of the Tonawanda Iron Corp.'s stacks from the merchant market Jan. 1. Tonawanda is a subsidiary of the American Radiator & Standard Sanitary Corp. The only inactive furnace out of the 16 in the area is owned by the Wickwire Spencer Steel Division of the Colorado Fuel & Iron Corp. One Wickwire furnace now is being operated by Republic Steel Corp. and a similar setup for the second furnace now is reported under negotiations although there is speculation about ability to line up a supply of coke. Output of Bethlehem's six stacks at Lackawanna is required by its own steelmaking department. Hanna Furnace Corp. operates four furnaces, three on pig iron and the fourth on ferroalloys.

Pittsburgh — Pittsburgh Coke & Chemical Corp.'s Neville Island stack is the only remaining merchant furnace in the Pittsburgh area serving the foundry trade. Recently, a number of gray iron foundries were forced to close while the furnace was on malleable iron. Malleable foundries likewise will be short during the period when the furnace switches over to foundry iron.

Some relief is expected by second quarter of 1948 when the Monessen, Pa., furnace goes into blast. The government had not quite completed this furnace when the war ended and it now has been sold to the Pittsburgh Steel Co. with the understanding that some 20,000 tons a month will be allotted to foundries. The furnace has capacity of 1200 tons daily. Incidentally, it will use a turboblower taken from the government-owned furnace operated by the Republic Steel Corp. at Cleveland, leaving the latter furnace without a spare.

It is estimated that less than 60 per cent of foundry pig iron requirements in this district now are being

BLAST FURNACE CAPACITY

(as reported by the American Iron & Steel Institute; net tons)

	(Net Tons)			
As of Jan. 1	Coke Pig Iron	Charcoal Pig Iron	Ferroalloys	Total
1947	64,674,020	32,480	1,002,700	65,709,200
1946	66,311,410	32,480	996,700	67,340,590
1945	66,256,810	64,480	992,600	67,313,890
1944	66,344,780	56,190	990,300	67,391,270
1943	62,859,330	107,200	967,000	63,933,530
1942	59,211,850	106,560	1,075,570	60,393,980
1941	56,522,370	106,560	980,660	57,609,590
1940	54,635,740	95,580	992,320	55,723,640
1939	55,162,374	103,040	1,060,416	56,325,830
1938	55,618,752	103,040	1,060,416	56,782,208
1937	54,418,489	103,040	1,035,776	55,557,305
1936	54,803,720	103,040	947,520	55,854,280
1935	55,999,710	150,640	947,520	57,097,870
1934	56,209,620	150,640	883,008	57,243,268
1933	55,452,964	159,040	898,688	56,510,692

PRODUCTION OF FERROALLOYS FOR SALE

Year	Ferro-manganese and spiegel	Ferro-silicon	Other Ferroalloys	Total For Sale
1946	283,915	1,036,078	155,488	1,475,481
1945	386,269	813,730	170,032	1,370,031
1944	458,932	829,377	196,115	1,484,424
1943	453,659	915,277	214,101	1,583,037
1942	453,106	869,990	158,883	1,481,979
1941	397,275	726,423	126,328	1,250,026
1940	312,485	494,677	81,135	888,297
1939	219,500	355,585	52,483	627,568

PRODUCTION OF PIG IRON FOR SALE

(As reported by the American Iron & Steel Institute; Net Tons)

	1946	1945	1944	1943	1942	1941	1940	1939
Basic	1,201,094	1,722,903	2,413,751	3,565,610	2,776,289	1,829,540	1,276,651	932,505
Bess. & Low Phos.	519,287	924,988	1,207,542	1,353,460	824,881	979,194	803,194	367,890
Foundry	2,334,452	2,061,870	1,948,514	1,882,162	2,345,843	2,478,277	2,093,607	1,767,445
Malleable	1,962,397	2,155,375	2,340,818	2,232,690	2,223,848	2,166,929	1,688,038	1,223,552
All other	153,008	115,334	110,643	104,672	98,943	99,190	87,680	64,217
Total	6,170,188	6,980,470	8,021,268	9,138,594	8,269,804	7,553,130	5,949,170	4,355,609

PIG IRON OUTPUT—SHOWING PER CENT OF FOUNDRY IRON PRODUCED

(As reported by the American Iron & Steel Institute; Net Tons)

*FOUNDRIES' SHARE OF PIG IRON PRODUCTION	9.8%	10.6%	8.6%	7.7%	7.3%	8.4%	9.4%
	1947 (9 Months)	1946	1945	1944	1943	1942	1941
Basic	33,316,627	33,727,655	39,866,982	45,886,008	45,374,662	43,532,865	39,759,841
Bessemer	†5,248,930	5,932,414	8,255,513	9,756,836	10,258,788	9,865,220	9,522,343
Low phosphorus	†130,000	167,013	314,063	474,686	538,832	562,672	474,428
Foundry	2,301,909	2,545,936	2,248,887	2,190,681	2,059,501	2,546,530	2,760,827
Malleable	1,933,317	2,190,285	2,350,076	2,494,659	2,393,241	2,399,520	2,417,137
All other	†165,000	215,493	187,648	204,569	185,646	169,137	165,975
Total	43,095,783	44,778,796	53,223,169	61,007,439	60,810,670	59,075,944	55,100,551

* Foundry and malleable grades. Includes some pig iron used by producers' own foundries. In 1946, percentage of foundry and malleable iron produced for sale was 9.6, in 1945 7.9; in 1944 7.0; in 1943 6.8; in 1942 7.3 and in 1941 8.4. † Total for bessemer, low phos and "all other" is exact but breakdowns are estimated by STEEL.

met. One pig iron producer expresses the opinion that the critical shortage will become more acute over the coming months, for there have been no "breather" periods due to coal strikes, etc. to accumulate pig iron stocks as was the case in 1946.

Scarcity of scrap and high prices have forced most integrated steel producers to increase the proportion of pig iron in open hearth operations, while merchant interests find it uneconomical to step up output through the use of blast furnace turnings at present high price levels. High prices also have prevented foundries from buying scrap as an offset to inadequate pig iron supplies.

Jones & Laughlin Steel Corp. has been forced to start a blast furnace relining program, which will involve three furnaces at the Pittsburgh plant and one each at Aliquippa and Cleveland. The program was initiated Nov. 1 when No. 1 furnace at Pittsburgh went down for ten to 12 weeks for a complete relining. For the first time in peacetime history, all 41 stacks of the U. S. Steel Corp. in the Pittsburgh-Youngstown district are in blast. Present expansion plans of steelmakers do not include blast furnace installations.

Youngstown — Of the 25 blast furnaces in the Youngstown district, 22 are owned by integrated companies and output is used as hot metal in making steel. Carnegie-Illinois lighted its new 900-ton No. 4 furnace at its Ohio Works Nov. 20, replacing a 750-ton unit built in 1904.

The Struthers, O., furnace with capacity of 181,440 tons now is operated by Kaiser-Frazer and entire output is going to foundries making parts for this company. Two furnaces owned by the Shenango Furnace Co., Sharpsville, Pa., and rated at 295,700 and 252,000 tons, respectively, are supplying an affiliate, the Shenango Penn Mould Co., along with some independent foundries.

Ohio and Kentucky—Shutdown of one of two furnaces operated by the American Steel & Wire Co. at Cleveland has pinched foundries further with the result that some have only enough iron on hand to operate for a week or so. Bulk of the pig iron output in this district is required in steelmaking. American Rolling Mill Co. is operating two furnaces at Hamilton, O. One of three furnaces at Ashland, Ky. went down for relining October 23 and will go back in momentarily.

Michigan—Two furnaces operated by the Ford Motor Co. and three by Great Lakes Steel Corp. with respective capacities of 504,000 and 1,100,000 tons are tied in with the integrated steelmaking operations of these two companies. Ford is building a new furnace which will be ready in about a year.

Chicago—While no accurate figures are available, it is indicated that roughly 750,000 tons of iron are being shipped to foundries from this district. Some of these foundries are as far away as St. Louis and Minneapolis. Nevertheless, iron also is being brought into Illinois from Colorado.

The Chicago district now has 41 blast furnaces, all of which are in blast. Inland has eight furnaces with capacity of 2,929,000 tons. Two were purchased from the government, the second having been completed and blown in on Aug. 2, 1947. No. 3 furnace, scheduled for abandonment some time ago, is still making iron.

About three years ago, Carnegie-Illinois announced that it was replacing No. 7 and No. 9 furnaces at its South Works. No. 7 with capacity of 232,200 tons was taken out and will not operate again but No. 9 is still making iron. In the meantime, the company is building two new furnaces of 520,000 tons capacity each and these will represent added capacity even though No. 9 is junked eventually. The ten furnaces now operated at South Works have capacity of 3,401,600 tons. At Gary, Carnegie has 12 furnaces with capacity of 4,402,700 tons.

Wisconsin Steel Co. operates three furnaces rated

at 719,710 tons but a substantial part of this capacity is devoted to supplying the hot metal requirements of its steelmaking department and foundries operated by the parent company, the International Harvester Co. Interlake Iron Corp. has two merchant furnaces in the Chicago district with capacity of 520,100 tons but one may have to be taken out any time for relining. Youngstown Sheet & Tube Co.'s East Chicago furnaces make only steelmaking iron but some merchant iron is turned out by the three stacks at South Chicago. Republic Steel Corp. bought a 450,000-ton furnace from the Defense Plant Corp. but is hard pressed to supply its own steelmaking requirements.

St. Louis—The two furnaces at Granite City, Ill., which were rehabilitated by the government during the war, now are being operated by Missouri-Illinois Furnaces Inc. About half annual output of 365,000 tons goes to foundries. These furnaces recently were acquired from the War Assets Administration with the understanding the same tonnage of iron will be available to St. Louis area users.

The South—War Assets Administration has worked out a deal whereby Arthur G. McKee & Co., Cleveland, will repair the Gadsden, Ala., furnace. After repairs are completed about February or March of next year, Republic Steel Corp. will produce foundry iron for pipe shops and other foundries in the South. Woodward Iron Co., with three furnaces rated at 526,170 tons, reportedly has pulled out of the northern market. Other pig iron producers in the district are Sloss-Sheffield Steel & Iron Co. and Tennessee Coal, Iron & Railroad Co.

The West — Purchase of a battery of coke ovens from the Defense Plant Corp. has made it possible for the Colorado Fuel & Iron Corp. to place its fourth blast furnace, previously held as a spare, in operation. This gives the Pueblo plant a capacity rating of 950,000 tons rather than the 798,000 tons reported by the American Iron & Steel Institute. Close to 8 per cent of the plant's present production is going to foundries.

FOUNDRIES IN THE UNITED STATES

Type of Metal Cast	1939	1941	1943	1945	1947
Gray Iron	3054	3006	2890	2879	3058
Steel	299	298	335	383	368
Malleable	138	141	126	139	133
Nonferrous	2747	2798	2631	3040	3218
Total	4776	4812	4802	5048	5452

There is a strong possibility that the furnace moved from Joliet, Ill., plant of the American Steel & Wire Co. to Ironton, Utah, during the war, may be sold and placed in operation. Portsmouth Steel Corp., Kaiser Co. and an unnamed interest are reported negotiating actively. Output of Geneva Steel Co.'s furnace at Provo, Utah, and of the three furnaces at Geneva is going into steel.

The small furnace moved to Rusk, Tex. during the war and scheduled for operation by the McCrossin Engineering Co. lacks a transformer and this has not as yet been located in surplus government inventory. If the furnace is operated, it can turn out 100 tons daily. Dropping of the government's pig iron subsidy program Dec. 31 may throttle some plans for resumption of high cost Western furnaces. In the meantime, the Lone Star Steel Co.'s Daingerfield, Tex., furnace with capacity of 274,000 tons has been blown in. Its price is $36, f.o.b., with a $12 subsidy. Iron from the Kaiser Co.'s 388,800-ton furnace at Fontana, Calif., is entirely absorbed by Kaiser interests.

For Western foundries, the outlook is not too bright. As one Southern California foundryman puts it, "We are not getting enough pig and don't know when we will. There is a dribble coming in from Daingerfield, Texas, but not enough to cut much ice. The outlook is very bleak and many foundries will go out of business if the supply of iron does not increase soon."

GOVERNMENT SUBSIDIES—It seems to be the consensus among a number of well-informed persons, that termination of the Federal Housing Expediter's premium price plan Dec. 31 will not prove to be the help that many foundries anticipate. There is talk that if the plan is not reinstated at the last minute, some furnaces, which have outrun their relining schedule in an effort to take advantage of premium prices, will take time out for repairs. No concrete cases are reported, however. Also, there has been speculation that furnaces cut off from housing premiums would advance prices sufficiently to compensate for the loss.

At present, there are 18 companies enrolled in the plan as follows: Alan Wood Steel Co., Conshohocken, Pa.; American Steel & Wire Co., Cleveland; Bethlehem Steel Co., Bethlehem, Pa.; E. & G. Brooke Iron Co., Birdsboro, Pa.; Colorado Fuel & Iron Corp., Denver; Geneva Steel Co., Geneva, Utah; Interlake Iron Corp., Cleveland; Lone Star Steel Co., Daingerfield, Tex.; Missouri-Illinois Furnaces Inc., Granite City, Ill.

Pittsburgh Coke & Chemical Co., Pittsburgh; Republic Steel Corp., Cleveland; Sheffield Steel Corp., Houston, Tex.; Shenango Furnace Co., Pittsburgh; Sloss-Sheffield Steel & Iron Co., Birmingham; Tonawanda Iron Co., North Tonawanda, N. Y.; Woodward Iron Co., Woodward, Ala., and the Youngstown Sheet & Tube Co., Youngstown, O.

Wisconsin Steel Division of International Harvester, Inland Steel Co. and Eastern Gas & Fuel Associates already have withdrawn from the plan. E. & G. Brooke probably no longer will qualify. Incidentally, a group representing the molders' union recently came to the Housing Expediter's office to say that Brooke's deal with three large users would force the shutting down of many foundries in eastern Pennsylvania. The deal does not come within the expediter's jurisdiction. Premiums have been paid on somewhere between 600,000 and 900,000 tons.

Scrap Carries "Influence"

Steel consumers, trying to avoid gray market purchases, seek open market scrap for use in cultivating relations with mills. One producer offers "influence credit"

CLEVELAND

ATTEMPTS of metalworking plants to obtain as much steel as they need without going into the gray market for some of it is putting those plants into competition for open market scrap with which to gain influence with steel producers.

This competition is leaving less and less scrap available for foundries, with the result prices have soared. In fact, prices of foundry scrap are still on the upgrade, No. 1 cupola, for instance, being quoted here at $56-60, compared with $46.50-47.50 two months ago, and $25 when Office of Price Administration price regulations expired late in 1946.

Supply Tightens—An indication of the desperate scrap situation foundries are facing is the report that a foundry here last week paid $75 per gross ton for a car of railroad malleable scrap. Addition of freight charges and broker's commission brought the delivered cost to $80. In paying this price, the buyer went considerably above the prevailing open market quotation of $67-70 in the latest week. Two months ago railroad malleable at Cleveland was quoted at $57-60, and at the end of OPA it was $24.

In attempting to strengthen their influence with steel producers, metalworking companies are reported paying $42-44 per ton for open market scrap and in turn letting the steel companies have it for $39-39.50. The steel consumer is willing to lose $3 to $4 per ton of scrap if he can avoid the gray market and save $120 to $245 a ton for steel sheets. In fact, if he can get an extra ton of steel without paying the gray market price for it he could afford to absorb the loss on a car of scrap. He is expected to sell the scrap to the steel company for prices based on $39-39.50, Cleveland, for heavy melting steel, for the steel producers have been showing resistance to any price higher than that. Incidentally, that scrap price is about double that which prevailed under the OPA.

How To Influence People—In an effort to get as much scrap as possible, the large steel producers have for some weeks been urging their customers to return their scrap in order to insure their getting steel. This has reduced the amount of open market scrap available. Now, one big steel mill is attempting to attract scrap by sending letters telling its customers that efforts to get scrap shipped to the producer will be "credited to your influence" with the producer. However, the mill points out that it is offering no trades of steel for scrap. The mill stipulates that it will pay not more than $40 for heavy melting steel scrap.

Hoping to gain the most "influence" possible, metalworking plants are reported attempting to return not only the amount of scrap generated in their fabricating work but to buy scrap on the open market and ship it also. This disrupts normal price relationships and in many instances involves cross-hauling.

CF & I Awards Contract For $3 Million Rod Mill

As the first major step in its $7 million improvement program, Colorado Fuel & Iron Corp., Denver, has let the contract for a $3 million rod mill at its Minnequa works, Pueblo, Colo., to Morgan Construction Co., Worcester, Mass.

The new rod mill will increase the Pueblo plant's rod capacity about 33 per cent and when completed will be one of the most modern rod mills in operation in the industry.

A special feature of the new installation will be a continuous billet mill, preceding the rod mill. Billets, produced in the company's rail mill, will go from the billet mill into a continuous-operation holding furnace and from there to the rod mill.

To utilize the output from the rod mill, additional wire drawing capacity will be needed in the Pueblo wire mill. Fourteen of the newest type Vaughn wire drawing machines have already been purchased and the principal engineering for their installation is well advanced. These machines will be in operation prior to the time rods are produced in the new mill, with that facility not expected to be in operation for about two years because of difficulty in obtaining delivery of electrical equipment.

Present, Past and Pending

■ TOOL MANUFACTURER BUYS FORGING PLANT
DETROIT—Miller Mfg. Co., manufacturer here of automobile repair and servicing tools, has purchased Buckeye Forging Co., Cleveland.

■ TOKHEIM COMPANY MAY BUY OHIO PUMP PLANT
FT. WAYNE, IND.—Tokheim Oil Tank & Pump Corp. proposes to purchase National Pumps Corp. plant at Dayton, O. A corporation to be known as National Pumps Inc. would be organized to direct sales, service and manufacture of National pumps.

■ STOPS BOOKING ORDERS FOR ALUMINUM SHEETS
PITTSBURGH—Aluminum Co. of America has temporarily stopped booking orders for aluminum sheets to protect its regular customers and curb speculative buying. Order backlog for sheets runs through first quarter, 1948. Orders for second quarter will not be accepted until January.

■ ALAN WOOD AND SUBSIDIARY WOULD MERGE
CONSHOHOCKEN, PA.—Directors of Alan Wood Steel Co. and its wholly owned subsidiary, Rainey-Wood Coke Co., Swedeland, Pa., have approved a merger of the two companies. Special meetings of stockholders of both companies will be held Jan. 7 to vote on the merger and a recapitalization plan.

■ ANTITRUST SUIT COSTS NOT DEDUCTIBLE FROM TAX
WASHINGTON—A company which pays money to settle an antitrust suit cannot claim payment as a business expense deduction for income tax purposes, the U. S. Tax Court has ruled. This holds true even if the company claims innocence of the antitrust charges.

■ PHILADELPHIA TO BE HOST TO METAL CONGRESS
PHILADELPHIA—The National Metal Congress & Exposition will be held here next Oct. 23-29.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

U.S. delegates to Havana trade conference encounter difficulty in getting agreement. Less industrialized nations want protection for their infant industries in the form of import quotas and tariffs

PRELIMINARY reports from Havana, Cuba, indicate that United States delegates are not having smooth sailing in their efforts to get agreement to an International Trade Organization charter that will prove acceptable to Congress. Major argument is from the less industrialized countries led by Mexican delegate Ramon Beteta Quintana.

This group wants amendments to the charter that will enable them to impose import quotas as well as tariffs for protection of infant industries, without prior approval by the ITO. It charges that the United States and other highly industrialized nations want to keep those less developed "in permanent economic inferiority or disadvantage."

The chief U. S. delegate William L. Clayton, supported by Dana L. Wilgress of Canada, holds firmly to his stand that the charter already is based on a compromise of many different viewpoints, and that inclusion of any negative or restrictive policies such as the above would be fatal to the ITO's chances of permanency.

From the United States standpoint, declared Mr. Clayton, "Enlightened self-interest" favors the industrialization of the backward countries because "our best customers have always been the developed countries, and we have repeatedly demonstrated this attitude through extension of credits, technical assistance and in other ways." The proposed charter, said Mr. Clayton, is the result of compromises which permit a "greater measure of restrictionalism than we believe wise, but we are willing to accept it if general agreement may thereby be attained."

Mr. Clayton refuted assertions that United States prosperity has been due historically to protective tariffs. "It would be more accurate to say that our development is a product of free trade among the 48 states," he declared.

Countries other than Mexico that are fighting for amendments to help their own cases are India, Switzerland, Poland, Sweden and Egypt.

The United States position at the conference has been helped materially by a decision that, in accordance with United Nations procedure, only member nations may vote whereas non-members may freely express their views even if they cannot vote. Non-member countries represented are Austria, Ireland, Finland, Italy, Portugal, Switzerland, Trans-Jordan and Indonesia, also Allied control authorities of Japan. Argentina, although herself a member, had led the effort to get voting rights for the non-members.

The other member countries, in addition to United States, Canada and Argentina, are Australia, Belgium - Netherlands - Luxemburg Customs Union, Brazil, Burma, Ceylon, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon-Syria, New Zealand, Norway, Pakistan, Southern Rhodesia, Union of South Africa, United Kingdom.

Chances Appear Slim

Although Chairman Hartley of the House Education & Labor Committee plans to proceed with his effort to get Congress in 1948 to pass a law making it a federal offense to interfere with a man's right to work, chances are not in his favor. Senator Taft, chairman of the Senate Labor & Welfare Committee, despite the rough treatment he got from union picket lines on his recent Pacific Coast tour, is opposed to such a law for a variety of reasons—and Senators Ball and Smith support him. His view is that to enforce such a law creation of a federal police force is necessary—and such policing should be left to the states. Further, the Senate majority leader feels, police enforcement methods should be kept out of labor-management relations as far as possible, since such interference usually serves to fan resentment and emotionalism, thus complicating labor-management disputes.

Representative Hartley plans to have his committee start hearings on his proposal Jan. 19 with Cecil B. DeMille as the lead witness. Mr. DeMille again is to tell the committee how labor union dictation drove him off the air as a radio producer-announcer.

Incidentally, a check with the joint Congressional Labor-Management Relations ("watchdog") committee reveals that this group does not expect to have anything to say in the near future. The committee is "well satisfied" so far with the working of the Taft-Hartley Act and the manner in which the National Labor Relations Board and its general counsel are administering it.

New Highway Aid Slated

Slated for recommendation to Congress in 1948 is a new federal aid highway program fully equal to the aid provided by the Federal Highway Act of 1944, it was learned during a recent meeting of highway officials held in Washington under the auspices of the American Road Builders' Association.

The 1944 act provided yearly aid in the amount of $500 million for fiscal 1946, 1947 and 1948, to be matched equally by the states. High prices, shortages of materials and equipment and shortages of personnel have held the postwar highway development program far under what it must be if crucial needs are to be met. A new three-year federal aid program, it was agreed, is a necessity and, in view of the price increases, larger grants than those in the 1944 act will be sought.

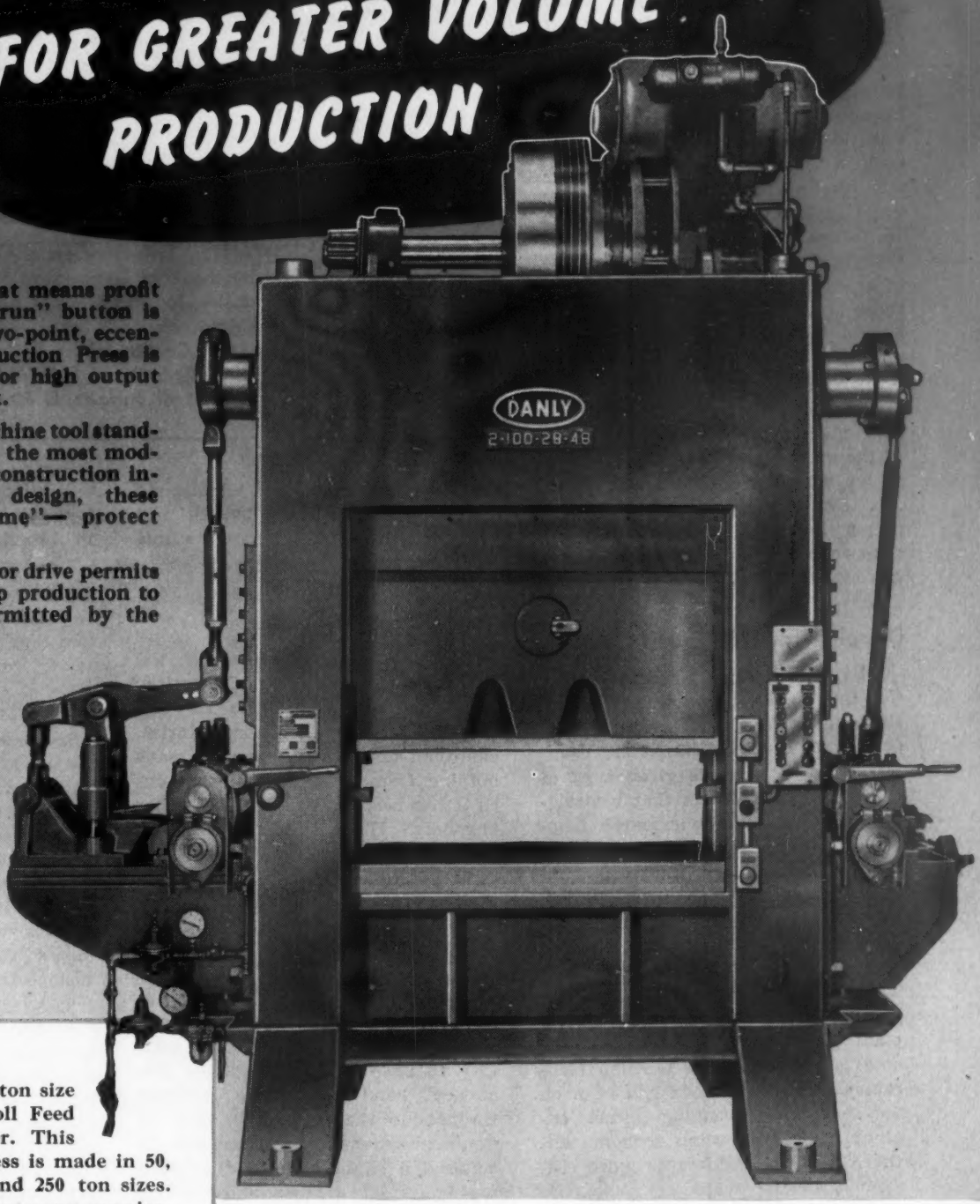
Army Research Program

To acquaint industry, the universities, scientific foundations and interested citizens with the activities of the Research & Development Division, Department of the Army, that unit has prepared an unclassified version of its program for the fiscal years 1948 and 1949. Copies may be had by addressing the division's Scientific Information Section, The Pentagon, Washington 25, D. C. The unit now is working on its program for fiscal 1950 which, in the main, will be an extension of the 1948 and 1949 programs. In general the Research & Development Division is working at these objectives:

Air transportability of military equipment, weapons as well as personnel; effective operation of equipment under extremes of climate and terrain; a higher degree of standardization and interchangeability of parts; development of full knowledge of substitute materials; adaptability of military equipment to quantity production.

Many industrialists will be inter-

HIGH PRODUCTION PRESSES FOR GREATER VOLUME PRODUCTION



HERE is a press that means profit every time the "run" button is pushed. This Danly two-point, eccentric gear, High Production Press is specifically designed for high output of strip up to ¼" thick.

Sturdily built to machine tool standards of precision, with the most modern features of press construction incorporated in their design, these presses cut "downtime"— protect costly dies.

A variable speed motor drive permits the operator to step up production to the highest speed permitted by the material being stamped.

Compare the features and construction of this line of presses against those of their type with which you are now familiar. Danly's Press Division will be glad to supply more complete information upon request.

Shown is the 100 ton size equipped with Roll Feed and Scrap Cutter. This type of Danly Press is made in 50, 75, 100, 150, 200 and 250 ton sizes. Send inquiries for your requirements to Danly.

Check and Compare These Features

- Two slide connections for accurate alignment.
- Fully enclosed construction (all weldments thoroughly stress relieved before machining).
- Circulating filtered oil pressure lubrication system. Pressure pump so arranged that press is inoperable until oil pressure builds to operating pressure.
- Variable speed motor drive (50-100 strokes per minute).
- Danly Improved Air-Friction Clutch.
- Flywheel shaft mounted on anti-friction bearings retained in removable pillow blocks provides easy accessibility for maintenance.
- Eccentric Gears, connections and gibs—bronze lined.

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THE PRESS FOR MODERN PRODUCTION

ested in this excerpt from a recent speech by Maj. Gen. Henry S. Aurand, director of the Research & Development Division:

"The past war, rather than outmoding toxic agents as weapons, has brought new developments in that field of such greatly increased significance no informed person today believes that toxics are out-of-date. Because gas was not used in the last war does not mean it may not be used in the future. For this reason, our research and development program gives quite a bit of attention to future super-toxic agents. Our thought is geared to the discovery of agents many times the toxicity of those of World War I—not improved agents but new agents much more powerful. These agents will be developed by a rival if not by us. Some of them have reached the test-tube stage which makes us aware of the necessity of following them up so we may develop proper defenses. . . . Development of such agents requires infinitely greater protection than we have at present, and instant methods of detection."

Diesel Engine Research

Otis D. Treiber, Hercules Motor Co., Canton, O., who went abroad in 1946 under the sponsorship of the Office of Technical Services, Commerce Department, is given most of the credit for the fact that a world-famous diesel engine research laboratory is to be brought to the United States. This is the Klockner-Humboldt-Deutz laboratory at Oberursel, Germany. Originally it was earmarked for shipment to Russia as reparations but that arrangement was cancelled after Mr. Treiber pointed out the importance of this plant to the United States. The notable feature of the German laboratory is that its work has been on 2-cycle, loop-scavenging diesel engines which, according to some authorities, are considerably more efficient than the customary American 4-cycle engines.

To put the German equipment where it will do the most good, John C. Green, director of OTS, has been in conference with the diesel engine industry. As a result, it has been decided to place it in a suitable educational institution, and the choice now has been narrowed down to Oklahoma A & M, Johns Hopkins, Penn State and the University of North Carolina. The question now under discussion is whether to set up a second diesel engine school in this country—Penn State now has the only such school—or whether to "put all the eggs in one basket" and create a "super" diesel engine school at Penn State.

OVERSEAS CONSULTANTS: Five members of Overseas Consultants Inc., organization created by the War Department to make an independent survey of Japanese industry, land at Newark Airport after an inspection trip to Japan. Left to right: Major Miller, United States Army; George V. Burgess of Coverdale & Colpitts; John R. Lotz of Stone & Webster Engineering Corp.; Clifford S. Strike of F. H. McGraw & Co.; and Frank R. Carhart of Jackson & Moreland

Steel Report Prepared

The Steel Subcommittee of the Senate Small Business Committee has written its report to the full committee but Senator Martin, chairman of the subcommittee, says nothing from it will be released until it has been approved by the other members. He is trying to expedite the handling of it so that printed copies will be available well before the end of December.

FCC Makes Band Shift

Conforming to an agreement at the recent International Telecommunications Conference at Atlantic City to have uniform spectrum frequency band allocations uniform throughout the world, the Federal Communications Commission has announced a slight shift in the bands for industrial heating and medical diathermy purposes. FCC spokesmen emphasize that the change is slight so that the cost to industry should not be great. In the main, crystal controlled equipment may require new crystals, while some equipment may need circuit changes.

However, plenty of time for changes is allowed since use of the present channels, 13,660, 27,320 and 40,980 kilocycles, will not be outlawed until after June 30, 1952. New channels which may be used at once and will become mandatory after that date are 13,560, 27,120 and 40,680 kilocycles with plus or minus tolerances, respectively, of 6.78, 162.72 and 20.34 kilocycles.

Dec. 22 has been set by the FCC as the final date for criticizing the new allocations, or for serving notice that a complaint is to be made.

Lowering Building Costs

In view of the universal demand for reduced cost of building homes, and the vast amount of research now going on in the approach to that objective, the Housing & Home Finance Agency, Washington, has launched a new magazine under the title "HHFA Technical Bulletin." Its editorial mission is to cover all new developments aimed at lowering construction costs.

The lead article in the first issue, for November, recites the moves in the direction of better building codes, which will eliminate excessive requirements such as over-thick walls and complex and oversize plumbing and which will encourage competition by expanding the list of eligible building materials. This article also tells of a program under which many obstacles to the introduction of new materials and methods would be removed; this program will involve new testing procedures under which a material after being declared satisfactory would meet with quick universal acceptance.

Other articles in the initial issue are entitled "Housing Research," "Insulation of Concrete Floor in Dwellings," and "Earth Construction." Subjects covered include the uniform plumbing code, lightweight concrete, and condensation control.

Tool Shipments Abroad Falter

OIT reports exports have declined from $14,385,945 in January to a monthly average through September of about $10.3 million. Cut in Russian shipments blamed

MACHINE tool exports from the United States have shown a declining trend during 1947. A tabulation made for W. H. Myer, chief of the Machinery & Metals Division, Office of International Trade, Commerce Department, shows exports for the first nine months aggregated $93,140,027 or an average of about $10.3 million a month. The January figure was $14,385,945, and the totals for subsequent months have been smaller.

Main reason for the decline is the drop in exports to our largest foreign outlet—Soviet Russia. Machine tool shipments to Russia in January came to $4 million whereas total for the first 9 months of 1947 was $14 million. Exports in millions during the nine months to other principal countries were: France $10.7, Canada $7.3, United Kingdom $7, Sweden $6.7, Argentina $4.9, Poland $3.5, Brazil $3.5, China $3.2, Netherlands $3.1, Belgium and Luxemburg $2.9, Mexico $2.6, Australia $2.6, Switzerland $2.6, Yugoslavia $2.2, Czechoslovakia $1.5, Union of South Africa $1.4, India $1.2 and Turkey $1.1.

War Changed Pattern—Interesting facts gleaned from the tabulation are that Canada now is our third largest machine tool customer abroad, and that the importance of Argentina as a machine tool customer has increased notably. Japan, always far up in the list as an importer of United States machine tools prior to the war, imported parts in the first 9 months of 1947 valued at $138. However, Japan's purchases are expected to be substantial after normal trade relations have been resumed. One of the puzzles in looking over the figures is the large purchases by Yugoslavia; the assumption is that most machine tools shipped to that country are reshipped to other destinations behind the Iron Curtain.

Lustron Lets Press, Die Orders for $1 Million

Orders totaling nearly $1 million have been placed for machinery to be used in the mass production of the low-cost porcelain enamel steel Lustron house, Carl G. Strandlund, president, Lustron Corp., Columbus, O., announced recently.

An order for $800,000 worth of presses, ranging in size from 50 tons to two of 600 tons, has been placed with Warren City Mfg. Co., Warren, O. Dies valued at $175,000 have been purchased from Carlin Tool & Die Co., Detroit, with immediate delivery promised by both firms.

The Lustron house will be turned out on an automobile assembly line basis at the company's plant in Columbus, where one million sq ft of space will be used.

Organized about a month ago, the company expects to employ a total of 7500 persons when it gets into peak production of 35,000 homes a year. Production is expected to start by late spring, 1948.

ASTE Schedules Show in Cleveland, Mar. 15-19

American Society of Tool Engineers expects its sixth annual Industrial Exposition, to be held in Cleveland's Public Auditorium next Mar. 15-19, coincident to the society's sixteenth annual meeting, to be the largest in this group's history.

The society's membership has increased to 18,000 since the 1946 exposition and more than 65 per cent of the available exhibition space for the 1948 show has already been contracted for.

Timken's Policies and Operations Explained

Under the title "The State of the Company," Timken Roller Bearing Co., Canton, O., brings together in book form a series of radio addresses on all phases of company operations and policies delivered during the period Mar. 24, 1946, to Mar. 30, 1947.

These talks, given to inform company personnel as to the scope and complexity of a large manufacturing company's problems, are informative to the general public as well because the problems are common in many respects to those of all manufacturing organizations. The 53 chapters, each of which is complete in itself, sketchily report on the multiplicity of details inherent in most company's operations. Of these chapters some are definitely applicable only to the Timken company's policies and operations.

Included in the individual chapters are the operations of the entire range of departments required to make an integrated company function. Sandwiched in between explanations of such diverse subjects as engineering, purchasing, manufacturing, sales and advertising, and labor and public relations are chapters devoted to specific Timken products and their applications.

Tinnerman Opens First Unit of Its New Plant

Tinnerman Products Inc., Cleveland, manufacturer of fastening devices, recently opened the first unit of its new plant at 8900 Brookpark Rd., Brooklyn Village, O.

More than 300 employees attended an open house at the building which will be used for a steel slitting mill and for warehouse accommodations. Manufacturing departments and general offices of Tinnerman will remain at the present Cleveland location until more units are finished.

Starting as a hardware store in 1879, the company began manufacturing stoves in 1913, developed its fastener, the Speed Nut, in 1923 and in 1940 discontinued making stoves to concentrate on fastening devices.

One Patent System for Europe?

OF PROFOUND future significance to American inventors is the introduction of a movement to create a single patent system for Europe. So far France, The Netherlands, Belgium and Luxemburg have thrown in together, and invitations to join have been tendered to the United Kingdom, Spain, Switzerland and Italy. Invitations are to be issued later to other countries.

The likelihood of co-operation from all the countries excepting the United Kingdom is considered good; the British may hesitate because they take considerable pride in already having a good patent system of their own. Headquarters for the new "European Patent Union" already have been established in The Hague.

Most significant development at this early stage is the decision to handle patent applications by an examination instead of registration system. That is, patents will be granted only after an examination to ascertain what novel features are covered and whether, therefore, the alleged inventions are patentable in the opinion of the examiners.

Higher Level of Shipbuilding Activity Vital

NEED for an adequate shipbuilding and ship repair program as an essential partner of the American merchant marine is the high point of the recent released report of the President's Advisory Committee on the Merchant Marine.

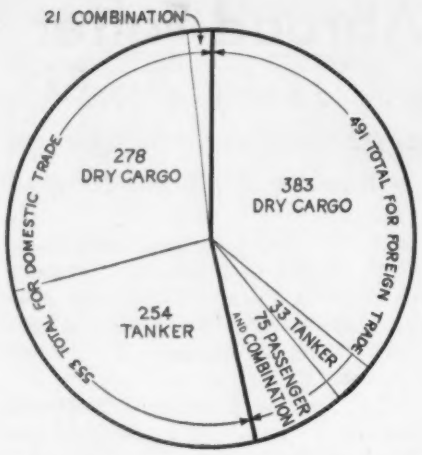
Recommendations for establishment of long-term policies designed to keep the merchant marine at least at minimum size are made with two conclusions in mind: 1. That a "modern, efficient merchant fleet and an effective and progressive shipbuilding industry are necessary economic adjuncts to the peacetime economy of the United States, despite the unavoidable present necessity of government financial aid to maintain them"; and 2. that "such a merchant fleet and shipbuilding industry are indispensable to national security and would have to be maintained even should there be no other benefits accruing."

Despite the fact the U. S. at present possesses about 45 per cent of total world tonnage of oceangoing ships, this tonnage for the most part represents ships of emergency types not well suited for highly competitive commercial operations. With the exception of high-quality cargo ships and tankers whose construction was continued throughout the war the dearth of suitable ships for peacetime use extends to those for domestic coastwise trade and those for passenger-carrying.

Work Coming to Standstill—Notwithstanding the grave shortage of these ships, the American shipbuilding industry is rapidly approaching almost complete inactivity. By early 1948, the committee reports, the only existing contracts for new ships will be for a large seagoing hopper dredge ordered by the U. S. Army Engineers and four small cargo ships for Argentina.

Meanwhile foreign shipyards are heavily engaged in constructing modern and efficient ships which will be in competition with American-flag ships.

"Unless new contracts are placed in the immediate future," the committee says, "the American shipbuilding industry will suffer such a loss in its technical and engineering staffs and in its skilled labor personnel that years will be required to restore it to a basis of substantial and effective operation."



The postwar American merchant marine, according to the Maritime Commission, should consist of 1044 ships in suitable balance as to types, with 491 to be used in foreign trade and 553 for domestic routes. Most urgent need is for modern passenger liners

Reiterating this danger, H. Gerrish Smith, president of the Shipbuilders Council of America, recently said that by the end of this year the volume of shipbuilding on hand will be only 50 per cent of what it was on Jan. 1, 1947. In fact on Nov. 1 only 32 seagoing merchant vessels and four dredges were under construction, aggregating 200,000 gross tons, as compared to 62 vessels of 391,000 gross tons being built in January. Of the ships currently building it is interesting to note furthermore that about 64 per cent are for foreign account. "If the present trend of declining activity continues," Mr. Smith warned, "shipbuilding in the United States will reach its lowest ebb in 50 years by the middle of next year."

Fleet Size Determined—In order to determine the minimum size of the merchant marine, suitably balanced as to types of ships in operation, and to hold the shipbuilding industry at the minimum size required for national security, estimates of the needs were gathered by the committee, and that of the Maritime Commission is presented in the accompanying chart. Based on a fleet of 1044 ships with deadweight of 11,400,000 tons, the commission's estimated fleet size compares with 1091 vessels of 9,310,000 tons flying the American flag in 1939.

The size of the shipbuilding industry required was also estimated by various government agencies and other groups called into the hearings. Based on these figures the committee thinks that to maintain an active fleet of approximately 1000 vessels and keep that fleet efficient and modern about 50 ships a year or about 500,000 deadweight tons should be built, the industry to require a labor force of about 75,000 men.

Passenger Ships Needed—Although this plan has not yet progressed to the point where complete details as to what types of ships would be built in any particular year are known, the most immediate need is for replacement of passenger-carrying vessels. To this end a limited government appropriation of $99 million of which $15 million is allotted for betterment of existing ships has been provided for fiscal 1947 and 1948. This amount, the commission says, "compels a modest start," but between the years 1948-1951, 46 passenger-carrying vessels should be built with eight to be scheduled in 1948, ten in 1949, 13 in 1950 and 15 in 1951. The passenger capacity of this program is less than 40 per cent of the passenger total which the Department of Commerce estimates will be traveling overseas in 1950. Its approximate cost, based on Maritime Commission estimates, would be about $550-600 million, with a considerable part of the government outlay to be recovered through the sale of these ships to private companies. In the program the committee envisions that this work be spread among all yards, rather than concentrated in a few, in the interest of encouraging a vigorous shipbuilding industry, and furthermore that the naval and merchant marine requirements be co-ordinated so that violent fluctuations in the level of activity be minimized.

American Brake Shoe Opens Two Foundries

American Brake Shoe Co.'s two new nonferrous foundries at Niles, O., and Meadville, Pa., were opened last week, Thomas W. Pettus, president of National Bearing Division of American Brake Shoe, announced.

The Meadville plant, replacing an older facility of the division formerly located there, will produce bronze bearings and castings. It will specialize in copper, brass and bronze for railroads, steel mills and other industries, and in precision machine bearings for diesel engines and other high-speed and heavy duty service.

The Meadville plant consists of a main foundry building, a two-story office structure and a separate unit housing a heating plant. The main foundry occupies 185,000 sq ft of floor space.

The new foundry at Niles will manufacture railroad journal bearings. Consisting of a foundry and machine shop, the facility has 35,000 sq ft of floor space.

British Pushing Steel Output Up

With 1947 goal of 12.5 million tons expected to be met, industry looks toward output of 14,750,000 tons in 1948. Two-million ton capacity boost projected

BRITAIN'S steel industry is confident its output will reach or even exceed its goal of 12.5 million tons this year, R. M. Shone, economic director, British Iron & Steel Federation, recently stated. In 1948 the home market will get about 13 million tons and the industry hopes to export an additional 1,750,000 tons, he said.

Domestic supply on the basis of these figures would be about 40 per cent above the 1938 level and well in excess of any prewar consumption. But to maintain production at that level stocks of scrap must be augmented. Already definite actions have been taken by some scrap users aimed at hastening the return of scrap to furnaces, and next year it is hoped one million tons can be imported from Germany. Raw materials supply and transport will probably be the industry's most difficult problems in the coming year, but every effort is being made to overcome these stumbling blocks, he emphasized.

Expansion Plans Progress — Discussing the industry's modernization plan, he said the Steel Board has already approved projects for more than half of the expenditures under the plan, $400 million in new construction and modernizations having received the go-ahead signal. This plan is to be initiated step-by-step over a period of about five years and will be completed in about seven and a half years. Its aim is to expand capacity from the 1945 level of 14 million tons to 16 million tons by 1952. In addition to new facilities, from 30 to 40 per cent of existing capacity is to be rebuilt.

Latest proposal under consideration by the board is that of Dorman Long & Co. Ltd. for two new blast furnaces at its Cleveland works. Estimated cost is $18,560,000. The iron would be used in steel furnaces now under construction. These furnaces, if approved, would be the largest in Great Britain and among the seven largest in the world. Raw materials would be delivered to them by belt conveyors, and their ladles would have capacity of 75 tons.

Belgium, Luxemburg

Acieries de Sambre et Moselle has blown in an additional blast furnace. Two more units are soon to be put in.to operation, one at Esperance-Longdoz and one at Oukree-Marihaye. Iron and steel exports from Belgium and Luxemburg in September amounted to 217,135 metric tons, making a total of 1,635,725 tons for the first three quarters of the year, compared with 1,102,735 tons in the like period of 1946. It is reported that Italy has ordered 1000 railroad cars and tonnages of iron and steel products from Belgium. The Belgian State Bank is issuing instructions that payment for exports to certain countries are to be accepted only in Belgian francs, Swiss francs or American dollars.

Czechoslovakia

Production of iron and steel remains at a satisfactory level. For pig iron there was a small drop in September to 118,600 metric tons, but output rose again in October to 125,016 tons. Production for the first ten months of the year was 1,185,027 metric tons. For steel, production in September increased to 197,000 tons, and further to 212,024 in October, totaling 1,895,024 tons for the first ten months of the year. Exports of Czech steel in September were 32,650 tons, including 7680 tons of plates and sheets, 7380 tons of tubes and pipe, 6260 tons of merchant steel and 3330 tons of wire products. Arrangements have reportedly been made with Russia for supply of 400,000 metric tons of iron ore, 40,000 tons of manganese ore and 3000 tons of chromium ore to the Czech steel industry. A recent agreement with Sweden provides that Swedish iron ore, ball bearings and machinery will be exchanged for Czech iron and steel products, machine tools and vehicles.

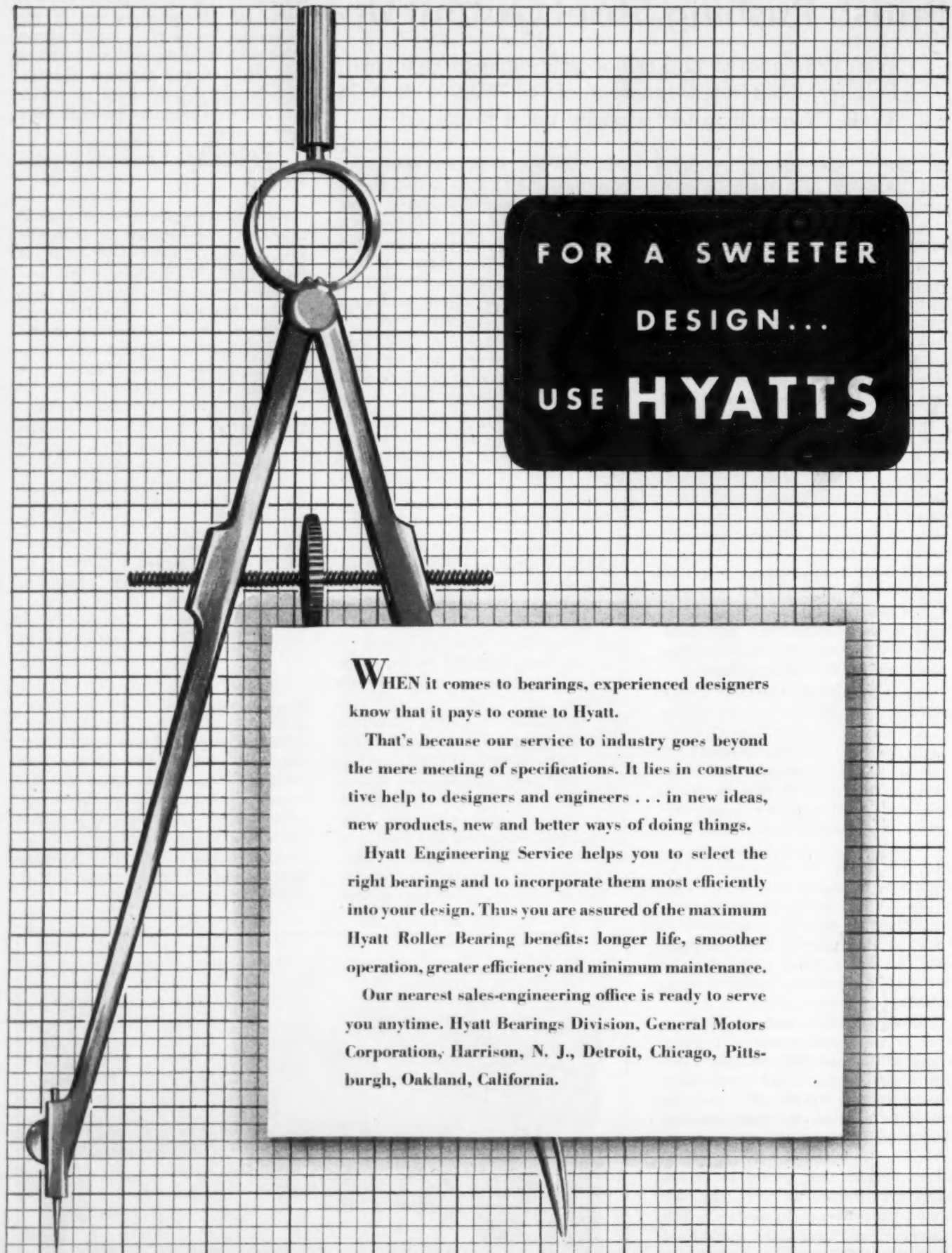
France

Production of plates in France is now above the average for 1938. For the first nine months of 1947, output was 238,000 tons, against 160,000 tons in the corresponding period of 1946 and 207,000 tons for the first nine months of 1938. For medium sheets, the corresponding figures were 146,000 tons, 92,000 tons and 126,000 tons. For light gage sheets, which are in short supply in France, production for the first three quarters of 1947 was 379,000 tons, against 272,000 tons in the corresponding period of 1946 and 423,000 tons in the like 1938 period. For most other rolled steel products output is higher than in 1938. Usines et Acieries de Sambre et Meuse is building an electric steel furnace with capacity of 15 tons which is expected to start operation in April. Construction of second electric furnace with capacity of 12 tons will soon be started.

Scandinavia

Danish imports of iron and steel for the first nine months of the year totaled 270,000 tons. These included mostly merchant steel, plates, sheets, tubes and pig iron. Leading suppliers were Belgium and Luxemburg, Great Britain, the United States, Czechoslovakia and Sweden. A small amount came from Russia.

FRENCH STRIKERS BLOCK SEINE: Barges are lined up by strikers across the historic river Seine to block water traffic into Paris and add to the paralysis caused by strike of other transportation workers. NEA photo



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HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

United Automobile Workers prepare to demand third round of postwar wage increases. Reuther establishes nine-man policy committee with sweeping powers to formulate strategies of 1948 campaign

DETROIT

DESPITE government urgings to go slow in campaigning for a third round of wage increases next spring, automobile workers in the UAW-CIO seem almost certain to plug for higher pay once current contracts can be reopened. Negotiations likely will start with General Motors in April, while the Chrysler Corp. contract may be opened upon 30 days' notice. The Ford agreement does not expire until late in June. Whatever pattern is set in one contract with the big three almost certainly will be followed by the rest of the industry.

Walter P. Reuther, president of the UAW, has just about completed a sweeping reorganization of his administrative ranks and has dismissed practically all followers of the old Thomas-Addes-Leonard faction. He has established a nine-man top policy committee which holds sweeping powers to formulate strategies the union will adopt in its 1948 wage drive.

Asks Price Rollback — On the basis of Reuther's current demands that the Congress roll back prices by at least 12 per cent, it might be inferred that the union's wage demands next spring would call for a boost of 18 cents an hour. No one in the official ranks of the automotive industry has even the remotest idea such an increase could be absorbed without an accompanying boost in prices; in fact, prices will have to go up even before any wage increase. The industry's position is that if labor must have 12 per cent more pay, then it should agree to work 12 per cent longer at straight-time rates. Another 5 hours on the work week would accomplish this and could be realized by either extending shifts to 9 hours or by working half a day Saturday. The former probably would be the most efficient method.

The union's stock answer to suggestions for working longer hours is that it would only lead to mass unemployment. The argument is advanced that even with the 40-hour week, it was necessary to make repeated short layoffs this year because of steel shortages, and with the steel industry operating virtually round-the-clock how is it going to be possible to increase automobile production by 12 per cent. That is, of course, a tough one to answer and the only hope is that steel production can be extended to the degree required.

Pensions, Wage Guarantees — Stability of employment and security of income, or the guaranteed annual wage and old-age pensions are two other facets of oncoming union demands. Still pending is a UAW demand upon General Motors to open discussions on the subject of old-age pensions. The corporation has instituted a much broader group insurance plan and the union greeted it with the charge that GM was trying to short-circuit pension negotiations. Actually, as C. E. Wilson, GM president, pointed out in an address before the National Association of Manufacturers recently, management is keenly aware of workers' desires for security and stability of employment, but in a changing economy with new products and processes constantly displacing old ones and with customers' tastes and demands constantly changing, the problem of stabilizing employment and income of factory employees is complex. Internally, it requires far-sighted management analysis and planning of products, and production and distribution processes. Externally, it may involve customer or supplier practices. It is further complicated by many and frequently conflicting governmental and trade union policies.

Legal Obstacles — Two legal complications stand in the way of better plans and programs of employment and income stabilization. The first is in connection with present tax laws, which make it difficult to establish and operate plans that require the accumulation of reserves because the law does not recognize reserves established for the operation of such plans as ordinary operating business expense at the time they may be set up. Second, rigid provisions of the wage-hour law with respect to the payment of overtime severely restrict the possibility for employment and income stabilization for many companies. The laws will need modification to promote instead of restrict constructive management efforts toward stabilizing employment.

Quoting Mr. Wilson . . . "The progressive aspect of employment security is that of opportunity for employees to progress and advance. There is no security in a changing world as great as that which comes from opportunity to qualify for a better job—to be given the chance to demonstrate one's greater economic and social worth. It is one of the responsibilities of management to develop the security of opportunity to the fullest, by keeping the door to advancement open to every worthy employee, and to do all possible to assist those who aspire to these opportunities."

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1947†	1946†
January	366,205	109,910
February	393,636	101,637
March	443,588	134,071
April	445,137	229,867
May	404,191	263,445
June	421,466	217,943
July	400,944	315,963
August	364,478	358,457
September	444,501	339,774
October	461,536	406,561
November	419,621*	389,645
December		393,223
12 mos.		3,260,496

* Preliminary.

† All monthly totals revised to conform with statistics of Automobile Manufacturers Association.

Estimates for week ended:

Nov. 22	115,197	96,434
Nov. 29	84,391	77,222
Dec. 6	109,728	93,907
Dec. 13	112,000	96,887

Estimates by Ward's Automotive Reports

K-F Distributes Bonuses

Christmas bonuses to the tune of $650,889 were distributed to eligible employees of Kaiser-Frazer Corp. last week, the money constituting the company's security trust fund for workers who meet minimum requirements for "presenteeism," length of employment and nonparticipation in any work stoppage. Last year the "kitty"

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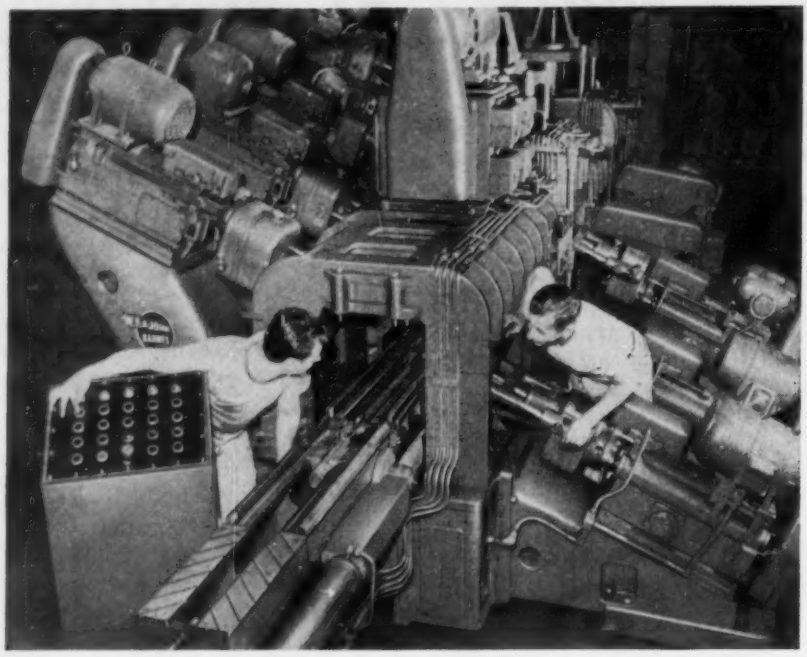


Seventeen separate multiple drilling operations are performed on Hudson 6-cylinder engine blocks by this machine installed by W. F. & John Barnes Co., Rockford, Ill.

amounted to only $55,036 and brought checks to individuals ranging up to $41.86. This year, although the number of participants is much higher, individual shares will be far above those of last year.

The bonus fund is part of K-F's labor agreement with the UAW-CIO and is based on the accumulation of $5 for each automobile shipped from Willow Run and $1 for each rototiller farm machine. Only $22,614 of the total came from the farm machinery, since this division moved from Willow Run in June.

Transfer-Type Machine Tools

Transfer-type machine tools are meeting increasing demand in the motor industry, where their features of high-production and minimum labor requirements are important considerations. One of the latest conceptions to be shipped is the "transfer-matic" equipment for machining the ends of Ford rear axle housings at a rate of 150 per hour.

The unit is 33 ft long and 24 ft wide, comprising a central elevating and transfer conveyor, hydraulically operated, on either side of which is a row of five standard horizontal spindle machining units. They are known as the Cross No. 26 machine, the entire assemblage having been designed by the Cross Co., Detroit, using this standard machine as the basic element.

Thus there are five stations along the transfer table, at each one of which operations are performed simultaneously on both ends of two axle housings, with fixtures provided between each station to accommodate two more housings. When the table is fully loaded, therefore, there are 20 housings in position.

Operations at the five stations are as follows:

1. Rough bore three inside diameters, face and chamfer.
2. Finish back diameter and flange.
3. Semifinish bores rough finished in (1).
4. Straddle face the flange, inside and out.
5. Finish face flange outside.

Operations Sequenced, Interlocked—Through individual control panels at each station, and a master panel at the loading end, all operations are sequenced and interlocked electrically. The transfer table elevates about 6 in., engaging the full load of work, advances two positions forward, then lowers, whereupon central locating plungers at each machining station lower through the banjo opening of each housing, accurately positioning the piece while the machining spindles advance to cutting position. All five stations operate simultaneously, following which the spindles retract, the locating plungers raise to clear the housings and the transfer table repeats its cycle. Each complete cycle requires only 40 seconds at rated speed.

Electrical hook-up obviously is rather complicated. For example, each of the six control panels requires up to 18 relays and there is over 5 miles of wiring in the system. Main drive motors on the machines are 15 horsepower, with ten required. The hydraulic system on each station requires a 3-horsepower motor. Two additional motors plus a hydraulic motor for the transfer platform bring to 17 the total number of electric motors, not to mention the 44 hydraulic cylinders required to actuate the various motions. All 32 cutter heads have carbide-tipped tools.

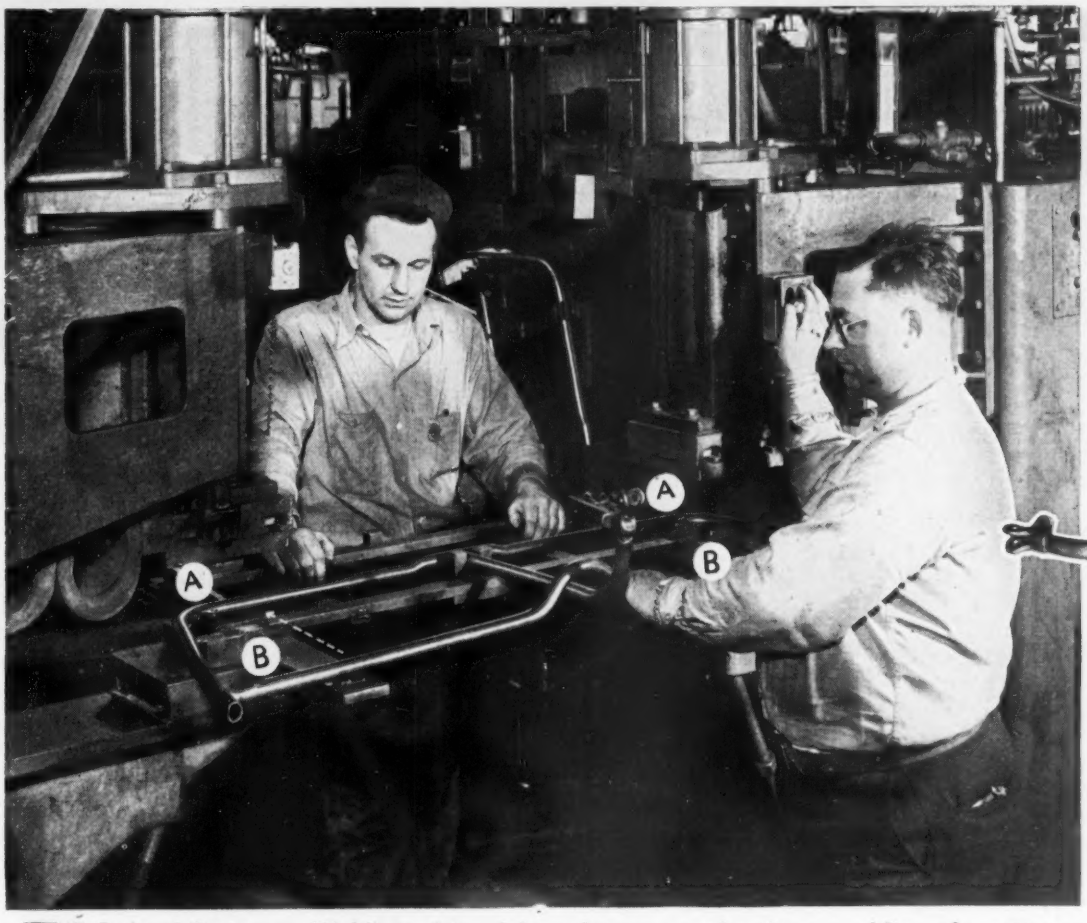
Installed at Ford—The equipment is being installed in the new Mound Road plant of Ford Motor Co., a former naval arsenal built during the war, recently acquired by Ford and now being equipped for production of gears and axles. Two of the transfer-matic units will be needed to handle projected production which is being aimed at 5000 daily. Parts produced will be for 1948 models and involve many changes from those currently in use. Rear axles, for example, are seamless steel tubing, S.A.E. 1030, with a stamped steel cover plate arc welded over the rear banjo opening.

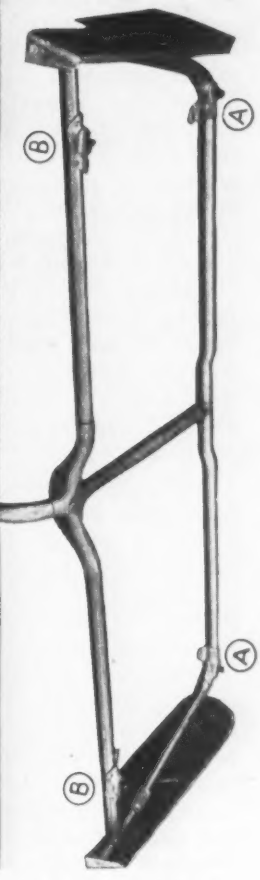
A single operator suffices to handle the entire axle machining unit. He loads two axles on fixtures before the first station, then presses a starting button; thereafter all he need do is to load axles. However, the controls are so arranged that any one machine may be started or stopped from the master control panel, and an emergency stop of the entire machine also is provided. Signal lights indicate whether all units are operating properly and, should trouble develop, a warning light indicates where it is. When installed, chips and coolant will fall into a full-length trough where a stream of 10,000 gallons of coolant an hour will remove chips for eventual separation and collection.

Cross Co. engineers have devised a number of these transfer-type machines. One version handles the machining of 500,000 pounds of railroad car axles daily, with fully automatic control. Another is processing truck axles, while plans are under development for other units to handle transmissions, manifolds and similar parts requiring repetitive operations on large numbers of pieces.

A similar type of machine, performing 17 separate multiple drilling operations on 6-cylinder engine blocks at Hudson Motor Car Co., has been installed by W. F. & John Barnes Co., Rockford, Ill., as a part of a $16 million improvement program at Hudson in connection with new models. This complex unit accommodates eignt blocks at a time and has a hydraulically controlled transfer table which moves the blocks through succeeding stations, all controls being centered in the panel at the lower left.

2400 Welds* Hourly on Federal AUTOMATIC RESISTANCE WELDERS





THE Federal Resistance Welding pictured here happens to be the assembling of studded brackets to a sliding seat frame, but the principle involved may well apply to some production of yours . . . the principle of getting the best possible juncture between two or more pieces of metal at the lowest possible cost.

In this case two Federal PA-2 press type welders are used as one projection welding unit. They are mounted on a single steel base for solid alignment, and synchronized with electronic controls to operate in unison. The dies are simple. Air-lift cylinders provide extra wide die opening for easy loading.

Brackets are dropped in each of the lower dies (A-A and B-B). The frame is then quickly positioned in dies A-A (no locking necessary). Seconds later, two brackets having become a part of the frame, the work is indexed in the direction of the dotted line and two more brackets welded (in dies B-B). Job is done in less than 30 seconds floor to floor, delivering 150 frames (600 brackets with 2400 welds) per hour.

These brackets are not merely "fastened" to the frame. They are a part of it, because resistance welding literally forges the two parts in a juncture stronger than the surrounding metal. That is one of the many superiorities of resistance welded fabrications.

This type of seat frame is automatically resistance welded throughout, and Federal provides welders for each operation . . . flash welding the tubular members, flash welding the Y-bracket and spot welding stampings to the frame.

**These are projection welds, four projections being stamped into each bracket. Thus eight welds (two complete brackets) are made during each cycle of this combination unit.*

Bulletin 4520 describes Federal Press Type Welders like those above. Bulletin SP-346 describes all types of resistance welders made by Federal.

THE Federal MACHINE AND WELDER CO.

SUBSIDIARIES
Sommer and Adams Co., Warren—SPECIAL HIGH PRECISION MACHINES
The Warren City Mfg. Co., Warren—WARCO PRESSES and PRESS BRAKES

4127 DANA AVE., WARREN, OHIO

MEMBER RESISTANCE WELDER MANUFACTURERS' ASSOCIATION RWMA

Sales Training Lab Opened By Simonds

FITCHBURG, MASS. — Responding to the invitation extended by G. K. Simonds Jr., general manager of the company, a large delegation of industrial editors gathered at the famous windowless, air-conditioned tool plant of Simonds Saw & Steel Co. Friday, Dec. 5. The occasion—unique in the 115 years of history of this company —was the preview of a replica of a typical New England "Little Red School House" which has been constructed in a corner of the factory from which is visible the entire 5 acres of straight line production operations.

Although the exterior of this "little building within a big building" is a replica of an old time district school, one passes into a truly modern industrial class room upon entering the door. Better, perhaps, it can be described as a sales training laboratory completely equipped with exact scale models of wood and metal-working machines arranged, equipped, tooled and "manned" just as they are in the forests, mills and machine shops where Simonds' cutting tools are used.

Models Displayed — These models, constructed by A. Stevens Lewis Associates of Chicago, are backed up by display boards carrying samples of the actual full size cutting tools whose applications are demonstrated in the miniature shops which occupy three sides of the schoolroom.

Sliding panels operate in a special alcove or stage at the fourth side of the room. One of these is a screen for showing the educational moving pictures which the Simonds company has specialized in with excellent results. Other panels carry samples of the company's extensive sales promotion, advertising and service instruction literature, as well as the new sales training course diagrams, photographs and text.

To carry out the "schoolhouse" spirit, the sales trainees will be furnished with notebooks with slate-like covers, "products primers" carrying photographs and text covering the exhibits, and upon graduation from the course, old-style diplomas will be issued. The course will include actual study of the production lines as well as class room work.

In his brief address to the visiting editors, Mr. Simonds said: "We feel that all salesmen—our own as well as those of our distributors — after passing through our manufacturing lines and studying in our 'schoolhouse'—will leave Fitchburg better informed, better qualified and more enthusiastic as marketers of all our products.

"Also, we believe that these miniatures will inspire our factory workers to greater efforts because of the interest which they will arouse in the end-use of our products. Only a small percentage of those who make these things ever have had an opportunity to see them in actual operation, nor have they been familiar with the types of machines on which they are used.

"The effort and expense involved in setting up this 'Little Red School House,' therefore, will be returned many fold."

Inside the "Little Red School House" at Simonds Saw & Steel Co. is this classroom with its displays of Simonds products and their uses

Murray Corp. Has Banner Year Despite Its Strike

Despite a 28-day strike last summer involving 75 per cent of its employees, Murray Corp. of America, Detroit, "can report the year ended Aug. 31, 1947, as the most successful in the corporation's history," according to President C. W. Avery in his recently released annual statement.

The past fiscal year saw completion of Murray's $8 million expansion program, a dollar-volume production of almost $65 million worth of automobile products and household appliances as compared with only $24 million in 1940 and further diversification into new products.

"The period ahead offers greater possibility than any other period in our history," comments Mr. Avery. "We are intensifying our efforts in research and product development to attain a higher degree of diversification.

Net profits in 1947 for Murray were $2,915,578 which equals four and a half per cent of total sales. This compares with a loss of $447,746 in 1946 and a profit of $857,871 in 1940.

Benjamin Wolff & Co. Holds Open House

Benjamin Wolff & Co., Chicago, marked its thirtieth anniversary as a steel and metal distributor Dec. 3 with an open house. Several hundred visitors were shown the company's new warehouse facilities completed recently at a cost of $350,000, including building and machinery. A one-story, 180 x 225-foot, brick and steel addition provides 40,000 square feet of floor space to raise the total to 60,000 feet. Featuring new equipment is a metal coating or decorating line.

Huge Auto Frame Press Placed in Operation

A huge press, capable of stamping out at a single stroke the 33-ft side rails used for frames of the largest busses, trailers and trucks in use today, was put into operation Dec. 9 at the Midland Steel Products Co., Cleveland. Designed and built by Clearing Machine Corp., Chicago, the unit is said to be the largest ever designed for automotive parts production. It affords twice the size of press capacity heretofore available.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Johns - Manville Corp., New York, has purchased Van Cleef Bros. Inc., Chicago, maker of industrial and automotive products. The Chicago firm will be operated as a wholly owned subsidiary of Johns-Manville. No change is contemplated in personnel, policies or products.

—o—

Federal Power Commission reports that 22,338,103,000 kilowatt-hours were produced by electric utilities in October, a new all-time high exceeding the previous record established last August by 2.7 per cent.

—o—

Ekco Products Co., Chicago, manufacturer of houseware products, has named D. E. Sanford Co., a national sales organization, as its sales representative.

—o—

Elizabeth Iron Works, Elizabeth, N. J., steel fabricator and manufacturer of materials handling equipment, is celebrating it 40th anniversary.

—o—

American Society of Mechanical Engineers, New York, plans to inaugurate a series of "universities" in key cities throughout the nation for graduate engineers, staffed by practicing members of the profession. The first of these is in progress in Detroit.

—o—

Leslie Co., Lyndhurst, N. J., manufacturer of pressure and temperature regulators and controllers, strainers and whistles, has named Seth A. Good & Co., Dallas, Tex., as its sales agent for northeastern Texas; Equipment Sales Corp., Kingsport, Tenn., for eastern Tennessee; and Fair Enterprise, Honolulu, for Hawaii.

—o—

Westinghouse Electric Corp., Pittsburgh, is producing equipment for 10 civilian airports to be constructed in Turkey. Initial shipment to Turkey is scheduled for some time this month. The airports will cost approximately $15 million.

—o—

American Society of Civil Engineers, New York, announces an annual award in honor of the late James W. Rickey, former hydroelectric engineer with Aluminum Co. of America, has been established for papers in the general field of hydroelectric engineering.

—o—

American Washer & Ironer Manufacturer's Association, Chicago, reports sales of standard-size washers in October totaled 394,649, an increase of 11.5 per cent over a previous all-time record set in September. Ironer sales in October aggregrated 58,722 units, an increase of 10.2 per cent over September figures.

—o—

Lovejoy Tool Co. Inc., Springfield, Vt., has appointed Burleigh-Stocker Machinery Co., Pleasant Ridge, Mich., as representative for its metal cutting tools in eastern Michigan.

—o—

Wolverine Tube Division, Detroit, Calumet & Hecla Consolidated Copper Co. Inc., has opened a mill depot at 11-26 46th Rd., Long Island, N. Y. Depot will stock seamless nonferrous tube.

—o—

American Machine & Foundry Co., New York, has contracted with the State Monopolies of Turkey to design and equip a factory for the manufacture of Turkish cigarets.

—o—

Rust Engineering Co., Pittsburgh, has formed a Process Engineering Division to extend its design and construction services to the chemical, petroleum and related industries.

—o—

Apprentice-Training Service, Department of Labor, reports that 183,000 apprentices are registered in the skilled trades, an all-time record.

—o—

Westinghouse Electric Corp., Pittsburgh, announces that nine new electric home heaters are in production at the company's Emeryville, Calif., plant. Eight are 240-volt units, while the other is a 120-volt model.

—o—

Harbison-Walker Refractories Co., Pittsburgh, has shortened the name of its basic refractory brick, "H-W Improved Metalkase," to "Metalkase." There is no change in the quality of the product.

—o—

Mid West Body & Mfg. Division, Paris, Ill., Electrographic Corp., has developed a portable steel step which may be attached anywhere on the steel rub-rail of Mid West truck bodies.

—o—

Phoenix Bridge Co., Phoenixville, Pa., has been succeeded by Phoenix Bridge Corp. New corporation will continue the same line of business as that of the retiring company, and there will be no change in personnel. Phoenix Bridge and its parent firm, Phoenix Iron Co., were purchased last fall by Phoenix-Apollo Steel Co., a newly formed organization.

—o—

Crucible Steel Co. of America, New York, recently opened a steel distribution warehouse in Primos, Pa., a suburb of Philadelphia. Facility was constructed and equipped at a cost of more than $200,000.

—o—

Cherry - Burrell Corp., Chicago, manufacturer of dairy equipment, expects to turn out in 1948 more than 1000 units of its bottle filling and capping equipment. Production for 1947 is estimated at 850 units.

—o—

Wisconsin Motor Corp., Milwaukee, controlled by Continental Motors Corp., recently produced its one millionth air cooled engine after 17 years of activity in this field.

—o—

Portable Electric Tools Inc. is now located in its new plant at 255 W. 79th St., Chicago.

—o—

Pratt & Whitney Division, West Hartford, Conn., Niles-Bement-Pond Co., has taken over manufacture of the products of Magnetic Gage Co., Akron. Operations will continue at the local plant until early in 1948 when they will be moved to West Hartford. Magnetic's line includes continuous electrical gages for rolling mills and similar operations.

—o—

Hotpoint Inc., Chicago, expects to sell 1,250,000 of its major appliances in 1948 and even more than this in the years following.

—o—

John Nooter Boiler Works Co., St. Louis, is now occupying a new shop building which adds 25,000 sq ft of space to accommodate larger equipment for the fabrication of tanks, vessels and special metal equipment. This project is part of a $300,000 expansion program.

—o—

Boice Crane Co., Toledo, O., manufacturer of bench woodworking machines, has changed its organization from a partnership to a corporation. No change in personnel, management or policy is involved.

—o—

Bendix Home Appliances Inc., South Bend, Ind., produced approximately 65,000 units in November, bringing production for the first 11 months of the year to 641,750 units. November production of automatic washers was 56 per cent greater than the output of November, 1946.

The Business Trend

INDUSTRIAL activity, which skidded sharply in the Thanksgiving week from the postwar peak, displayed its resilience in the week ended Dec. 6 by again bounding upward. Higher level of operations in all basic industries boosted STEEL's index of industrial production 11 points to 168 per cent (preliminary) of the 1936-1939 average.

SALES—Manufacturers' sales rose $1 billion in October over September, to a total of $15.7 billion, Department of Commerce estimates. Although nondurable goods industries accounted for the major part of this gain, sales by durable goods industries were up $350 million from the previous month to $6.8 billion. Figured on a daily basis, however, total sales of durable goods slipped 2 per cent from the September rate, with declines in sales of transportation equipment more than offsetting advances in the iron and steel and nonferrous metals industries.

INVENTORIES—Manufacturers' inventories in October reached $23.4 billion, an increase of $350 million from the previous month, Commerce Department reports. Of total inventories, $12.2 billion was held by durable goods manufacturers, an increase of $100 million over September. The rise was spread equally among the industries in this classification.

NEW BUSINESSES—With more new corporations started in October than since last April, the total for the first ten months of 1947 has reached 94,624, according to Dun & Bradstreet Inc. October saw 9690 businesses begun, or 12.2 per cent more than in September. This year's aggregate, however, is 17.3 per cent below that for 1946's ten-month period.

PRICES—Further rises in wholesale prices for most major commodity groups in the week ended Nov. 29 again pushed the Bureau of Labor Statistics index to a postwar high. It is now 159.8 per cent of the 1926 average. Up 0.7 per cent and 0.2 per cent, respectively, from the previous week were prices of industrial raw materials and manufactured products.

CONSTRUCTION—Postwar record of $214,014,000 in civil engineering construction volume was set in the week ended Dec. 4 and was the highest volume since the second week in November, 1942. Next year's new construction is expected to reach $15.2 billion, according to a joint Commerce-Labor Department forecast. This volume, dollarwise, would top the 1942 peak, but in physical volume would be 20 to 25 per cent below the levels of 1942 and the mid-1920s.

COAL—Output of 12,085,000 tons of bituminous coal in the week ended Nov. 29 brought the cumulative total for the year to 563,055,000 tons, or 15.3 per cent ahead of production for the corresponding period of 1946, National Coal Association reports. Stocks of bituminous coal and lignite held by industrial consumers and retailers in October increased 3.9 per cent over September, according to Bureau of Mines, to 50,276,000 net tons, with industry holding 48,144,000 tons of this total. Industrial consumption in the month, at 40,546,000 tons, was 10.6 per cent above September.

The Index (chart above): Week Ended Dec. 6 (preliminary) 168 Previous Week 157 Month Ago 167 Year Ago 134

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	97.5	96.5	96.0	60.5
Electric Power Distributed (million kilowatt hours)	5,218	4,983	5,057	4,673
Bituminous Coal Production (daily av.—1000 tons)	2,014	2,150	2,141	340
Petroleum Production (daily av.—1000 bbl.)	5,265	5,257	5,240	4,695
Construction Volume (ENR—Unit $1,000,000)	$214.0	$116.8	$97.3	$105.4
Automobile and Truck Output (Ward's—number units)	109,728	84,391	106,651	93,907

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

TRADE				
Freight Carloadings (unit—1000 cars)	840†	792	910	729
Business Failures (Dun & Bradstreet, number)	60	72	72	37
Money in Circulation (in millions of dollars)‡	$28,817	$28,725	$28,635	$28,906
Department Store Sales (change from like wk. a yr. ago)‡	+10%	+9%	+13%	+3%

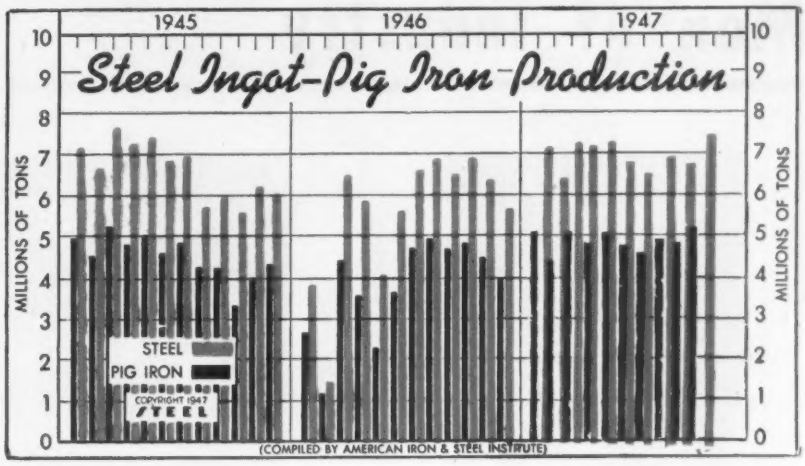
† Preliminary. ‡ Federal Reserve Board.

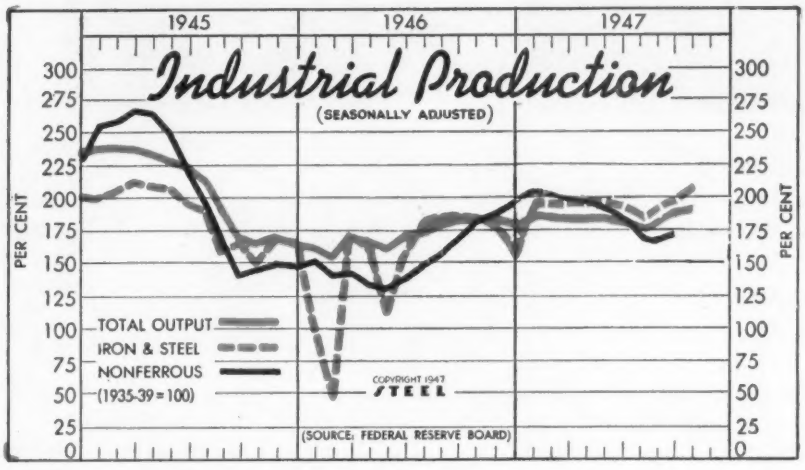
Iron, Steel Production

(Net Tons—000 omitted)

	Steel Ingots			Pig Iron	
	1947	1946	1945	1947	1946
Jan.	7,213	3,872	7,204	5,071	2,645
Feb.	6,422	1,393	6,653	4,550	1,148
Mar.	7,307	6,507	7,706	5,123	4,424
Apr.	7,043	5,860	7,290	4,830	3,614
May	7,329	4,072	7,450	5,081	2,275
June	6,969	5,625	6,841	4,810	3,682
July	6,570	6,610	6,986	4,585	4,705
Aug.	6,982	6,887	5,735	4,917	4,898
Sept.	6,789*	6,518	5,982	4,801	4,687
Oct.	7,564	6,910	5,597	5,228	4,815
Nov.	....	6,409	6,200	....	4,435
Dec.	....	5,701	6,058	....	3,992
Total	....	66,364	79,702	....	*45,379

* Adjusted.





Federal Reserve Board's Production Indexes

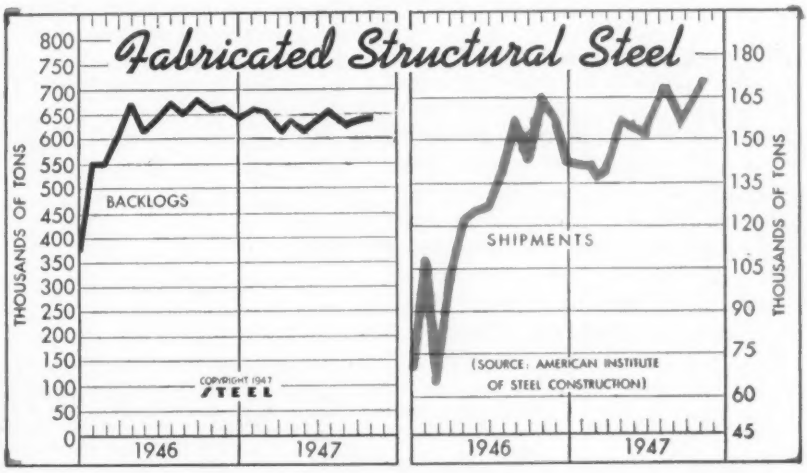
(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	189	160	192	102	204	150
Feb.	189	152	191	43	205	141
Mar.	190	168	196	169	199	139
Apr.	186	165	195	159	197	132
May	185	159	197	109	187	128
June	184	170	193	154	179	137
July	177	172	181	180	172	151
Aug.	182	178	188	184	171	159
Sept.	186	180	195	185	174	172
Oct.	189	182	204	184	...	184
Nov.	...	183	...	178	...	192
Dec.	...	182	...	159	...	197
Ave.	...	171	...	150	...	157

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
Jan.	140.6	107.5	57.0	661	552	124
Feb.	136.1	63.8	49.0	656	551	152
Mar.	137.8	102.8	59.5	614	605	153
Apr.	157.4	122.5	62.8	632	674	163
May	155.0	124.4	72.6	628	615	166
June	151.9	126.8	69.2	634	642	195
July	169.9	140.2	69.9	661	674	194
Aug.	158.0	157.5	70.6	639	651	201
Sept.	164.3	141.9	63.4	648	682	248
Oct.	173.6	164.7	76.6	649	660	283
Nov.	....	157.3	78.0	...	665	305
Dec.	....	142.1	68.8	...	646	375
Total	....	1,551.6	797.4	...	...	...



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,323	$13,910	$12,817	$11,911
Federal Gross Debt (billions)	$258.0	$258.3	$258.8	$262.4
Bond Volume, NYSE (millions)	$27.5	$16.6	$16.3	$29.3
Stocks Sales, NYSE (thousands)	5,803	3,879	3,664	6,116
Loans and Investments (billions)†	$65.0	$64.9	$65.0	$57.8
United States Gov't. Obligations Held (millions)†	$37,724	$37,829	$38,192	$37,859

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$76.09	$76.09	$76.09	$64.45
All Commodities†	159.8	159.2	157.4	139.1
Industrial Raw Materials†	177.9	176.7	175.9	154.8
Manufactured Products†	152.5	152.2	150.0	134.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

V. C. ORANGE

JOHN I. SNYDER JR.

ROY E. MURPHY

V. C. Orange has been appointed maintenance and service superintendent of Atlas Steels Ltd., Welland, Canada. Associated with the steel industry for many years, he has been affiliated through the years with the United States Steel Corp., Jones & Laughlin Steel Corp., Bethlehem Steel Co., and Republic Steel Corp He joined Atlas Steels Ltd. in 1941. as superintendent of forging and production machine shops.

—o—

N. George Belury has been appointed vice president of the Engineered Castings Division, American Brake Shoe Co., New York, and **Harry C. Platt** has been named works manager. Mr. Belury, formerly sales manager, has served in various sales capacities since he joined the company in 1937. Mr. Platt, formerly division metallurgist, has been with Brake Shoe's metallurgical department since 1942. They will maintain headquarters at the division which is located in Rochester, N. Y.

—o—

John A. Patterson, Wendell W. Waterman, Leonard A. Wasselle, and **Walter L. Bass** have joined the Rust Engineering Co., Pittsburgh, to assist in developing a new division offering process design and engineering services to the chemical and petroleum industries.

—o—

Harry E. Orr, formerly general manager of operations, Vanadium Corp. of America, New York, has been appointed assistant vice president and manager of district sales of the corporation. He will be in direct charge of the Chicago sales district, with headquarters in Chicago, in addition to supervising other sales districts of the corporation. **D. G. Bowser,** formerly metallurgical assistant to the executive vice president, will succeed Mr. Orr as general manager of operations, with headquarters at Niagara Falls, N. Y.

—o—

John I. Snyder Jr. has been elected chairman of the board of Pressed Steel Car Co. Inc., Pittsburgh. He resigned his position as manager of the buying department, Kuhn Loeb & Co., investment bankers of New York. He has been a board member of Pressed Steel Car Co. since January, 1947. He succeeds **J. F. MacEnulty,** who resigned last June. **Col. Robert C. Downie,** president, Peoples First National Bank & Trust Co., Pittsburgh, has been elected a director.

—o—

Link-Belt Co., Chicago, announces appointment of **Leonard C. Heinlein** to the newly-created position of assistant superintendent at the company's Ball & Roller Bearing Division plant in Indianapolis, and that of **Columbus Basile** as superintendent of the Caldwell plant in Chicago, which manufactures items of materials handling and power transmission equipment.

—o—

Robert E. Forrester has joined the engineering department of Parker Appliance Co., Cleveland. He will assist in the design of aircraft fuel and oil system components. He has been connected in engineering capacities with Langley Field NACA laboratories, Fisher Body Division, and Koehler Aircraft Products Co.

—o—

John L. Beard has been promoted to manager of the Small Products Division, American Hoist & Derrick Co., St. Paul. He joined the company in 1945, and will now direct sales and merchandising for his division through American Hoist's world-wide sales organization. **Steve C. Brown** has been appointed advertising manager of the company.

—o—

The I-T-E Circuit Breaker Co., Philadelphia, has announced election of **Roy E. Murphy** to vice president in charge of sales, to be in charge of the company's sales programs, and co-ordinating the combined selling of I-T-E and its subsidiary, the Railway Industrial Engineering Co., Greensburg, Pa. He has been associated with the company since 1934 as sales manager and member of the board of directors.

—o—

Samuel Insull Jr. has been elected vice president, Stewart-Warner Corp., Chicago. He will continue in charge of the Radio Division of the company. Before his appointment last January to the position of assistant to president, Stewart-Warner, Mr. Insull had been vice president, Central Barge Co., Chicago. **Henry Gillig** has been appointed superintendent of radio production for Stewart-Warner Corp.

—o—

Sherman H. Perry, general sales manager, has been appointed vice president in charge of sales, Chase Brass & Copper Co., Waterbury, Conn. He succeeds **Robert L. Coe,** recently elected vice president of Kennecott Copper Corp., and placed in charge of Kennecott's fabricating subsidiaries, of which Chase Brass is one. Four other promotions in Chase Brass are: **Marvin A. Joy,** appointed to succeed Mr. Perry. He will be in charge of sales personnel and sales of Chase

Faster Cutting, Longer Tool-Life, Reported for the New Sun Cutting Fluids Containing No Animal or Vegetable Fatty Oils

Since Sun recently announced the new grades of Sunicut with Petrofac, favorable performance reports have been coming in on practically every kind of metal-cutting job.

Higher cutting speeds, longer tool-life, increased production, better finish, performance superior to that of any cutting oils previously used . . . these are the "Job Proved" results that are constantly being reported.

"10% increase in tool-life on our automatics" . . . "chaser-life increased 50% on pipe-threading machines" . . . "finer finishes" . . . "best cutting oil I have ever used" . . . say typical reports from our customers.

No animal or vegetable fatty oils go into the new Sunicut grades. The Petrofac used in compounding is entirely derived from petroleum. The new Sunicut Cutting Oils with Petrofac possess superior metal-wetting and anti-welding properties, as well as unusual extreme-pressure characteristics.

Sunicut with Petrofac will not turn rancid. It is available in plentiful supplies and at reasonable, stable prices. Call in your Sun Cutting Oil Engineer for full information, or write Department S-12

SUN OIL COMPANY
PHILADELPHIA 3, PA.
"Makers of the well-known Sunoco Emulsifying Cutting Oil"
In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

SUN INDUSTRIAL PRODUCTS

SUNOCO

*Petrofac is a trade-mark of Sun Oil Company

mill and warehouse products. **William A. Amelung,** appointed manager of the Warehouse Division. **Harry E. Gordon,** named assistant sales manager, and **Richard R. Quay,** promoted from assistant secretary to secretary and assistant general counsel. As secretary Mr. Quay succeeds **Seymour S. Jackson,** who resigned following his transfer to the New York headquarters of the Kennecott Corp. Mr. Jackson retains the office of general counsel of the Chase company.

—o—

Hans A. Vogelstein has been elected secretary of American Metal Co. Ltd., New York.

—o—

R. F. Holtz has been appointed assistant to the general traffic manager of U. S. Steel Corp. subsidiaries —American Bridge Co., Carnegie-Illinois Steel Corp., H. C. Frick Coke Co., National Tube Co., and United States Coal & Coke Co. Mr. Holtz formerly held the position of assistant to the traffic manager of the Pittsburgh district, and has been affiliated with subsidiaries of U. S. Steel Corp. for 41 years in traffic and transportation work.

—o—

Eugene B. Mapel has been appointed supervisor of education and training, Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp.

—o—

Republic Steel Corp., Cleveland, formerly represented in public relations matters by outside counsel, has appointed **E. S. Bowerfind** to direct its newly-established public relations department. Mr. Bowerfind has been associated, for the past 14 years, with Hill & Knowlton, public relations firm which represented Republic Steel. **Henry W. Hopwood,** also formerly employed by Hill & Knowlton, will assist Mr. Bowerfind, and **William D. Martin,** editor of Republic's employee magazine, *Republic Reports,* will be a member of the new department.

—o—

Dr. W. David Stallcup has been named manager of the Naval Stores Division, Glidden Co., Cleveland. He succeeds **E. W. Colledge,** who has relinquished his duties to Mr. Stallcup, to devote full time to the business of E. W. Colledge G.S.A. Inc., Jacksonville, Fla., of which he is president. Mr. Colledge will continue in the capacity of sales agent for the products of the Glidden Naval Stores Division.

—o—

Samuel Beall has joined the staff of Films for Industry Inc., New York, to write and supervise motion picture production. His headquarters will be in Cincinnati.

—o—

E. M. Sarraf has been appointed district sales manager, Harbison-Walker Refractories Co., Pittsburgh. He has been assistant district sales manager in the Cleveland territory for the past year.

—o—

B. B. Kimball has been appointed advertising manager of Pontiac Motor Division, General Motors Corp., Detroit. He has been with the division for 30 years, most of them in the division's advertising department. He succeeds **P. R. Warmee,** who has resigned to become a Pontiac dealer at Van Nuys, Calif.

—o—

Kenneth J. Flood has been named factory manager of the Detroit Engine Division, Kaiser-Frazer Corp., Willow Run, Mich. He succeeds **A. C. Breitenbeck,** who has resigned. Mr. Flood has been with Kaiser and associated companies since 1931.

—o—

Chicago Steel Service Co., Chicago, announces appointment of **Jack P. Thompson,** as district manager for northern Indiana and the southern tip of Michigan. He will have headquarters at South Bend, Ind. In this territory he succeeds **Walter N. Colbath,** district manager for southern Indiana, who now concentrates his efforts to serve steel consumers in the Indianapolis area, his headquarters.

—o—

Norman L. Deuble has joined the metallurgical engineering staff of Climax Molybdenum Co., New York. For the past four years he has been with the M. W. Kellogg Co., Jersey City, N. J., in charge of special processes, and of the work in the high temperature laboratory. He spent two years in the Steel and the Aircraft Divisions of the War Production Board, and prior to that was sales manager of the Copperweld Steel Co., Warren, O.

—o—

Robert J. Kelly has been named Cincinnati zone sales manager for Buick Division, General Motors Corp., Detroit.

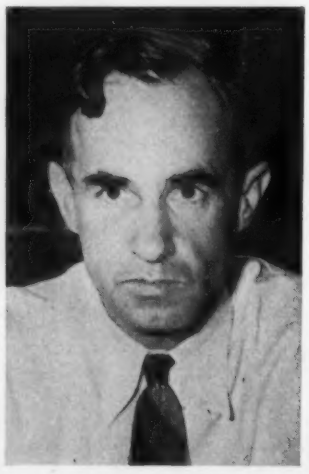
—o—

Henry D. Sharpe, president and treasurer of Brown & Sharpe Mfg. Co., Providence, R. I., has resigned as treasurer of the company, which position he has held since 1904. He continues as president. **Frederick P. Austin Jr.** succeeds Mr. Sharpe as treasurer, and has also been named a vice president. Formerly serving as assistant treasurer since 1941, Mr. Austin has been a director of the company since 1945. In the Dec. 8 issue of STEEL, Mr. Austin's picture was incorrectly captioned as that of Mr. Sharpe.

—o—

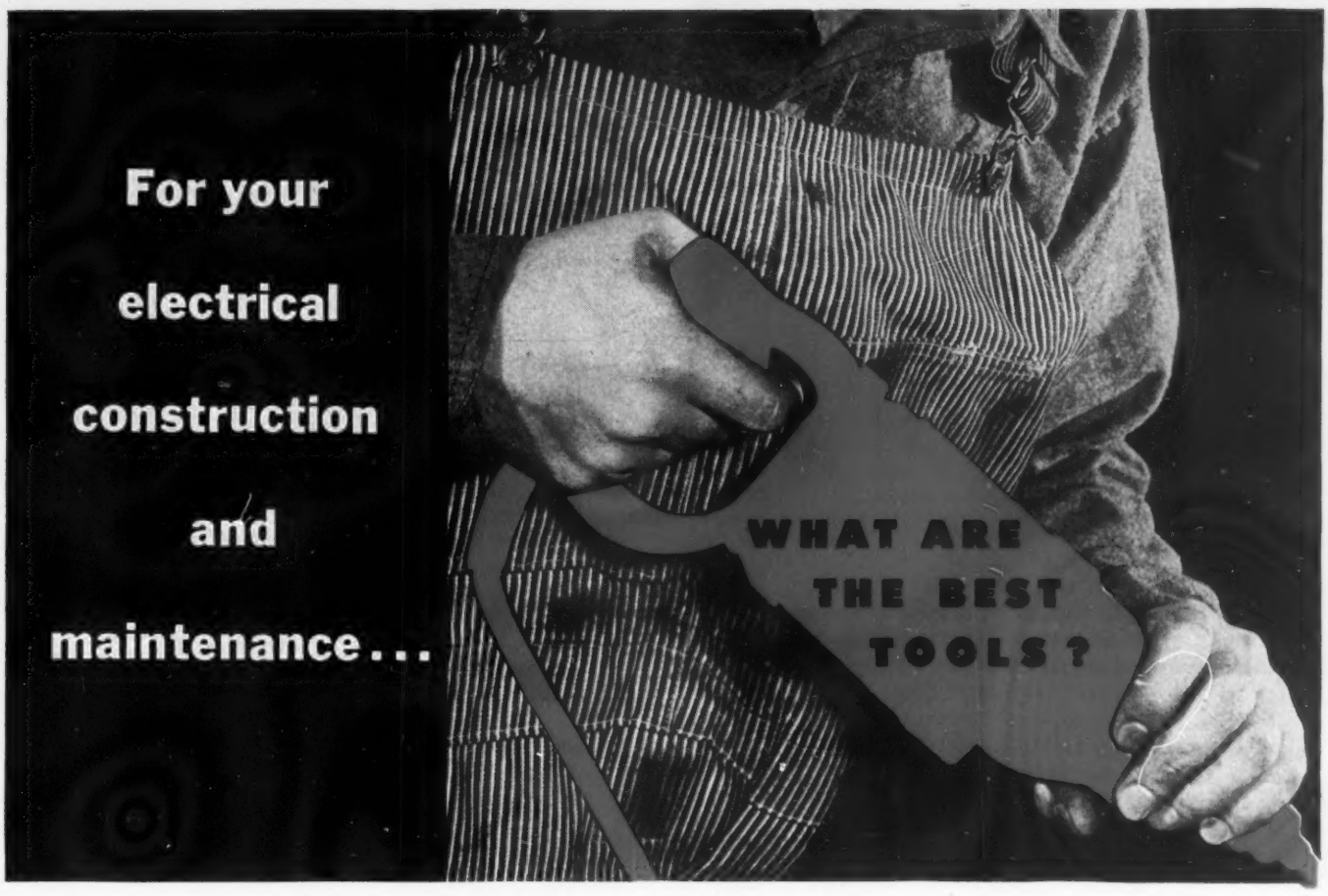
Harry T. Silverman has been appointed assistant superintendent of shops, Midland Works, Crucible Steel Co. of America, Pittsburgh. He previously had been with Youngstown

E. S. BOWERFIND



KENNETH J. FLOOD

F. P. AUSTIN JR.



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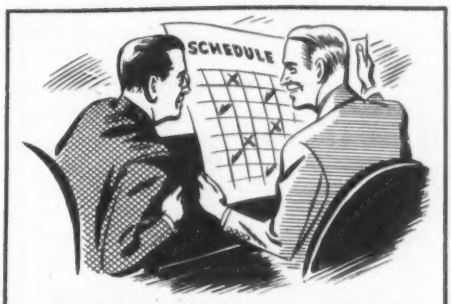
Whenever you need portable electric tools or other tools for electrical work, call your near-by Graybar office. Our local warehouse can deliver many of your needs immediately. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.* 4782



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Although production of many electrical items has overtaken demand, you may have found that there's still a waiting list for some of the supplies you want. But that needn't keep you from going ahead! If you plan with us now, we can supply what you need to begin almost any electrical job—and schedule deliveries of the rest to fit in with the progress of the work. From the variety of lines Graybar distributes, it's often possible to obtain satisfactory alternates, if necessary, to keep the job moving.

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...convenient source of 60,000 electrical items

IN OVER 90 PRINCIPAL CITIES

WIRING • LAMPS and LIGHTING • COMMUNICATION • SIGNALING • VENTILATION • CONTROL • POWER APPARATUS • TOOLS

A. A. WAY

Appointed manager, Chevrolet Motor Division plant, Tonawanda, N. Y. Noted in STEEL, Dec. 8 issue, p. 86

ROBERT D. MOSSMAN

Appointed manager of advertising, Jones & Laughlin Steel Corp., Pittsburgh. Noted in STEEL, Nov. 24 issue, p. 76

A. H. WARDWELL

Appointed director of raw materials, American Steel & Wire Co., Cleveland. Noted in STEEL, Nov. 24 issue, p. 76

Sheet & Tube Co., Indiana Harbor Works, and prior to that, associated with Standard Steel Spring Co., Coraopolis, Pa.

—o—

Randolph H. Hoy, for the past 19 years sales manager of the Pittsburgh territory, Universal Atlas Cement Co., a U. S. Steel Corp. subsidiary, has retired after 40 years' service in the same territory with the cement company. **Fred L. Wagner** succeeds Mr. Hoy. Mr. Wagner has been assistant sales manager in the Pittsburgh territory.

—o—

Richard C. Arnold has been appointed resident director of the newly completed liquid rubber latex creaming plant, at Rengman, Johore, Malaya, for Goodyear Tire & Rubber Co., Akron. **Claude E. Titus** has been appointed assistant to Mr. Arnold, and **John J. Riedl** has been named chief chemist, with headquarters in Singapore.

—o—

Frank Leslie Estep, active in the steel industry in this country and abroad since 1900, has become associated with the Barium Steel Corp., New York. He will supervise and advise on activities of the 16 subsidiaries of the corporation, one of the first activities to be in connection with the expansion and improvement of the plant of the subsidiary, Central Iron & Steel Co., Harrisburg, Pa.

—o—

Arthur B. Morse has been named a vice president and assistant director of sales, Laclede-Christy Clay Products Co., St. Louis. He previously had been connected with Stockton Fire Brick Co., San Francisco, and its successor, Gladding, McBean & Co.

—o—

Norton Co., Worcester, Mass., has appointed **DeRoss Salisbury Jr.** as abrasive field engineer for the Cleveland area. He will make his headquarters in Cleveland with the district manager, **F. P. Hays.**

OBITUARIES

Joseph T. Ryerson, 67, a director of Inland Steel Co., and its subsidiary, Joseph T. Ryerson & Son Inc., both of Chicago, died Dec. 7 in that city. He was a grandson of the founder of the latter company and brother of Edward L. Ryerson, who is now chairman of both companies. Becoming associated with the Ryerson company in 1902, Mr. Ryerson served successively as treasurer, vice president and president, relinquishing the latter post in 1929.

—o—

Thomas W. Warner, 73, retired auto parts manufacturer, died Dec. 2 in Pasadena, Calif., where he had lived in retirement since 1921. He organized Warner Electric Co., Muncie, Ind., in 1898, and was an executive of many companies which were an integral part of the automobile industry, two of which were the Warner Gear Co., Muncie, since developed into a principal unit of Borg-Warner Corp., and Warner Mfg. Co., Toledo, O., now merged with General Motors Corp., of which Mr. Warner had been a director.

—o—

Frederick S. Chase, 85, retired president, Chase Brass & Copper Co., Waterbury, Conn., died Dec. 5 after a heart attack on Thanksgiving Day. He retired from active management of the Chase company in 1938, but retained an interest in the affairs of the corporation, and was a director of Kennecott Copper Corp., parent company.

—o—

David Robertson, owner of Robertson Mfg. Co., Cleveland, and for more than 30 years identified with Rolls-Royce Ltd. of England, died Dec. 8.

—o—

A. E. Harrison, 81, retired general superintendent of foundries and pattern shops, Allis-Chalmers Mfg. Co., Milwaukee, died in Hollywood, Calif., Dec. 2.

—o—

William M. Meguigan, 72, retired superintendent of blooming and bar mills at the former Portsmouth Works, Wheeling Steel Corp., Portsmouth, O., died recently at Snyder, N. Y. The Portsmouth Works is now owned by Portsmouth Steel Corp.

—o—

Clarence E. Bradburn, 60, founder and president, Pacific Iron & Steel Co., Los Angeles, died Dec. 5 at his home in Pasadena, Calif.

—o—

Robert B. Ellison, 65, former president and general manager, Ellison Bronze Co., Jamestown, N. Y., died at his home there recently.

—o—

William J. Buckley, 51, president, Hercules Certifier Corp., Rome, N. Y., died recently after a brief illness.

—o—

George R. Huntley, retired executive of the Carborundum Co., Niagara Falls, N. Y., died recently in St. Petersburg, Fla. He joined Carborundum in 1904 and became successively production superintendent and assistant manager of products control. He retired in 1946.

Engineering News . . . AT A GLANCE

MAKES DIES IN 24 HOURS—Ford Motor Co. research engineers, using an alloy of bismuth, tin and lead are processing small dies for experimental purposes in a matter of 24 to 48 hours. In the process, which saves some 6 to 8 weeks of waiting time over previous methods, the metal—ordinarily too soft to stand pressures imposed on dies—is chilled in liquid nitrogen until its surface becomes hard as brass. From six to ten stampings may be obtained between chillings in the nitrogen bath, researchers say.

PROMOTES CLEANER STEEL—Chief advantage of graphite base refractory brick developed by Graftex division of McFeely Brick Co., Latrobe, Pa., is reported to be its nonwetting qualities to molten metal or slag. Its use promotes production of a cleaner steel since corrosion is reduced to a minimum under normal operations. According to the company, the brick is successfully being used in open hearth spouts and runners, hot metal ladles for blast furnaces and other applications involving metal production.

FACTS AND THEORY "PLANT"—To develop more uses for industrial gases, Air Reduction Co., New York, is employing some 250 engineers, metallurgists, physicists, chemists, machinists and other technicians in its new lab in Murray Hill, N. J. Work is divided into two general stages —research which consists of studies of basic physical and chemical phenomena underlying industrial production, and development engineering to translate facts of the studies into new commercial apparatus, machinery and processes, or into improvements of existing developments.

PRODUCTION SHORTCUT—In drawing gas turbine blades, one German firm used a special lubricant made from corn starch, soap, graphite and waterglass. This made it possible to dispense with the pickling and copper plating procedure prior to each drawing, according to the Office of Technical Services, Washington. Formerly, blades were pickled and copper plated before being drawn, then deplated before being annealed, and replated before the next draw. With the lubricant, the metal is coated prior to the drawing operation and the coating dissolved with hot water after drawing and prior to annealing.

HOT ROOM—In testing refrigerators in its Evansville, Ind. plant, Servel Inc. subjects the units to virtually an "industrial hot foot." Units are taken directly from the production line and placed in a hot room maintained automatically at 100° F. Furthermore, ice-cube trays of each refrigerator are filled with water at 100° F before the test is started. The testing area simulates about the worst possible conditions a refrigerator will encounter when in actual use.

HEAT-RESISTING LUBRICANTS—Molybdenum sulphide, a product refined by oil flotation and marketed as a finely divided black powder, and boron nitride, a light fluffy white powder often referred to as white graphite, are experimentally being used for some interesting applications as high-temperature lubricants, according to G. L. Sumner, writing in the *Westinghouse Engineer*. Different chemically as they are in appearance, both have achieved the same success alone and in combination with other materials in offering solutions to specific, stubborn problems of lubricating moving parts at elevated temperatures.

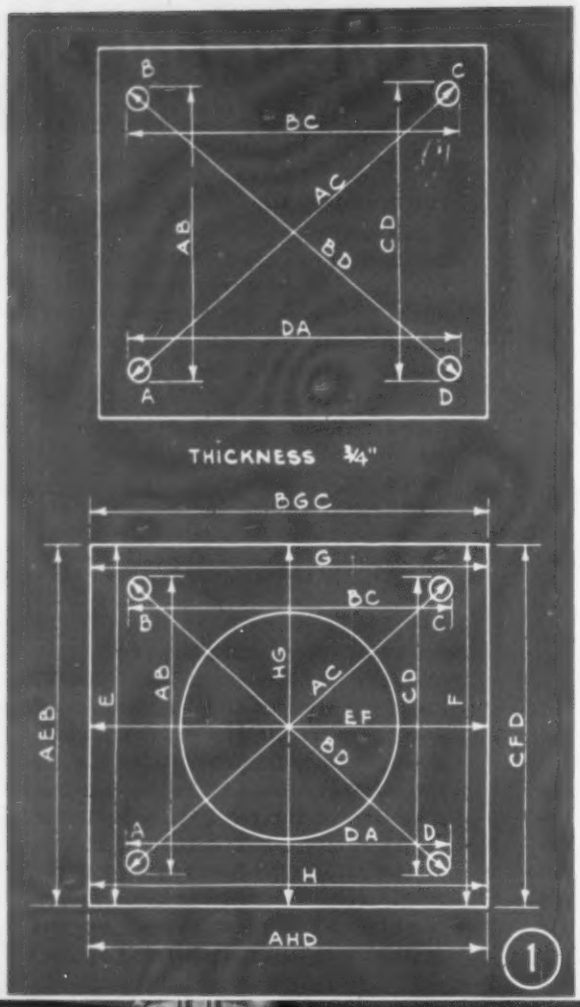
OVERCOMES DISTORTION — Use of salt martempering for most of the die hardening treatments used in the plant of Atwood Vacuum Machine Co., practically eliminated distortion—yet a very noticeable amount of growth occurred to impede maintenance of proper clearance for dowel pin holes. By resorting to modified procedures of martempering in hardening these intricately-shaped dies, the company effectively reduced serious distortion, warpage or dimensional change. (p.88)

NO CASTING CURE-ALL — Some engineers labor under the impression that the use of centrifugal force in making a steel casting—regardless of design—automatically confers on it qualities unobtainable by the use of the static method. This is not so. Selection of the most suitable means of forming steel, it is pointed out, is dependent on performance and economic considerations as well as the peculiar advantages offered by the method employed. (p.90)

TUMBLE DEBURRING—Gears can be deburred in a fraction of the time formerly required by hand methods —and with corresponding reduction in cost—by effective use of precision tumbling. In one plant, for example, burrs and heat treat scale are removed, radii are produced to blueprint specifications, and a uniform high-grade finish is imparted on each gear in the entire run. (p. 93)

NEEDLE PERFORMANCE—Needle bearings can be operated at high speeds—even as high as 50,000 revolutions per minute for periods of 3 years—depending on load, precision installation, lubrication and operation conditions. It is pointed out that a needle bearing assembly with a carbon steel shell might be expected to lose load capacity around 350° F, since this material may begin to lose hardness at about that temperature. (p. 96)

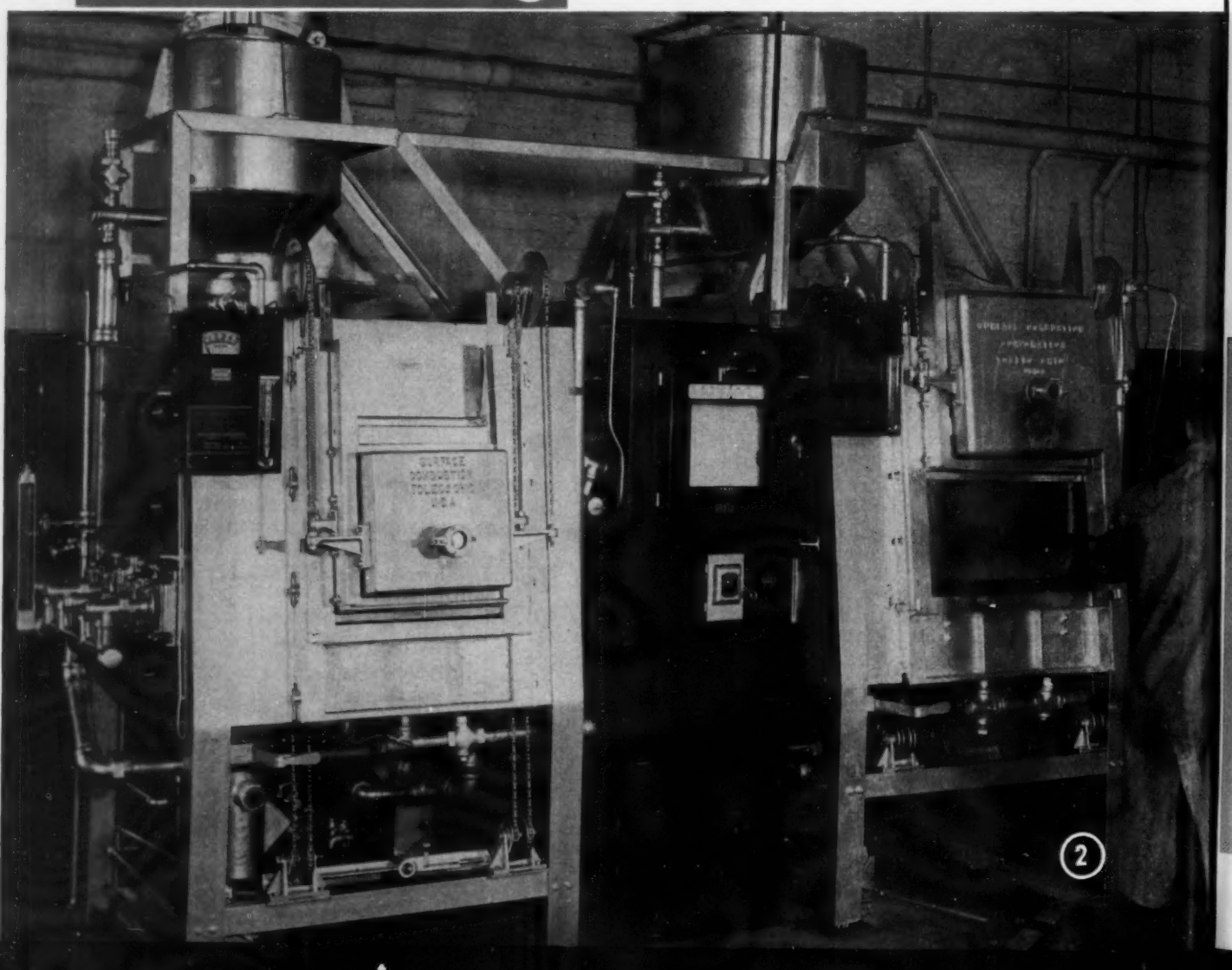
DETAILS RULE—In steel plant operations, according to W. H. Kahler, Westinghouse lighting engineer, lighting should be apportioned according to visual requirements in different mill areas. Areas involving manual tasks where fine detail is not a consideration, 5 foot-candles is enough for safety. (p. 118)



Use of Modified Martempering

. . . for hardening intricately-shaped dies

By WILHELM OLSON and GERALD NEVINS
Metallurgists
Atwood Vacuum Machine Co.
Stonington, Conn.



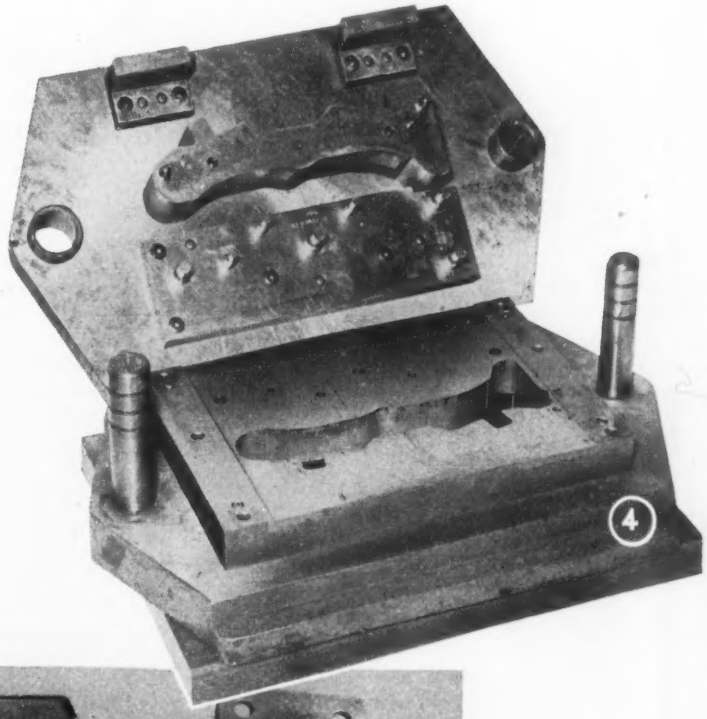
ONE of the major concerns of any company producing a large number of stampings is the successful hardening of intricately-shaped dies without serious distortion, warpage or dimensional change. A large number of dies are produced at our plant for various presses which range in size from 18 to 800 tons. While some of these dies are made from air-hardening, high-carbon high-chrome, shock resistant steel; the greater majority are made of manganese-chrome-tungsten oil-hardening steel.

To keep production costs at a minimum the company made it a policy to use the most modern and efficient heat treating equipment available and at the same time investigate new methods. For some years modern atmosphere furnaces with automatic temperature controls have been used for heat treating dies, Fig. 2. When the concept of martempering was introduced, its possibilities for reducing distortion to further improve quality and reduce costs, were investigated.

Results of preliminary tests were pleasing and salt martempering was adopted for most of the die hardening treatments. Although the process practically eliminated distortion and produced very satisfactory hardness, a new problem arose, however, in that a very noticeable amount of growth occurred. In the case of smaller dies this was not too serious. In large dies, however, both one-piece and sectional, considerable trouble was experienced in maintaining proper clearance for dowel pin holes even though an attempt was made to anticipate the amount of growth and allow for it in machining.

Test bars of a fixed shape and size reacted uniformly to heat treatment, resulting in uniform growth. On the other hand, dies varied a great deal in shape and size and thereby made the amount of growth unpredictable. Solid dies reacted differently from those that contained large holes or those of unequal sections. Edges not parallel to either axis were also difficult to locate properly. Every effort was made to modify the procedure in an attempt to correct the situation, but without noticeable success. Finally the conclusion was reached that while cracking and distortion were eliminated, growth was a normal result of salt martempering and simply had to be tolerated.

Recognizing the fundamental laws governing the precepts of martempering it is not difficult to explain this growth. The (*Please turn to Page* 115)



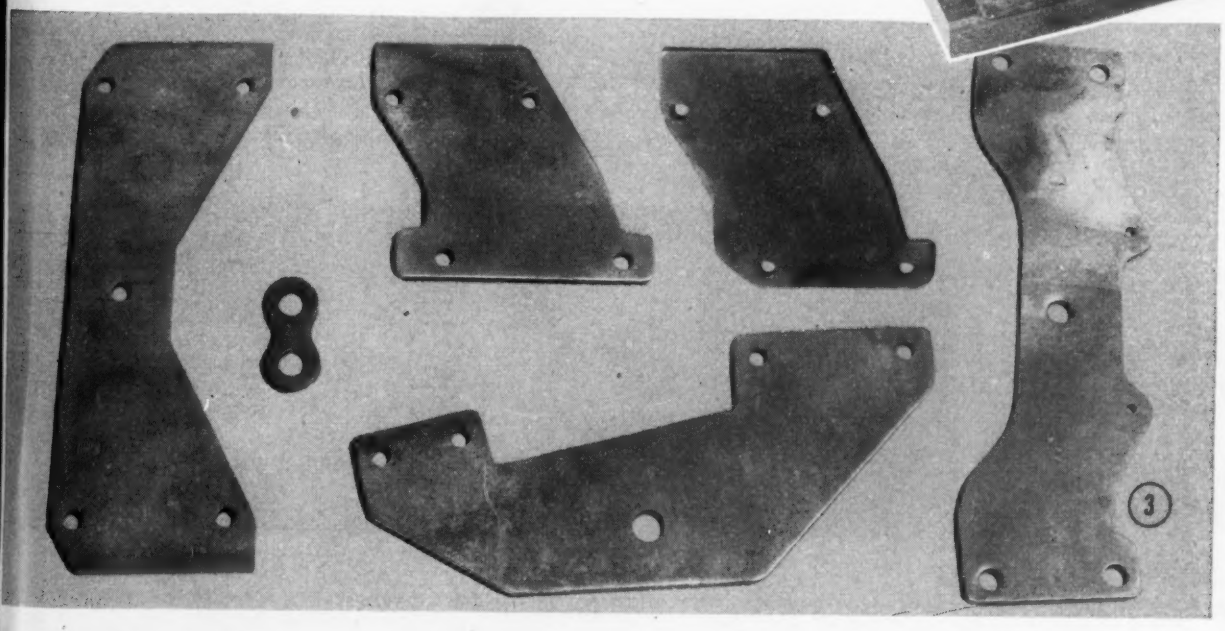


Fig. 1—Drawing, bottom, shows how measurements were taken on solid test specimens; top drawing shows how measurements were made on bored specimens

Fig. 2—Two Surface Combustion Char-Mo furnaces used in modern heat treatment of dies

Fig. 3—Group of metal shapes produced from modified martempered dies at Atwood Vacuum Machine Co. These shown below vary in size from 2¼ to 11⅛-inches in length

Fig. 4—This die is typical of those treated by modified martempering. All photos courtesy Surface Combustion Corp.

Engineering

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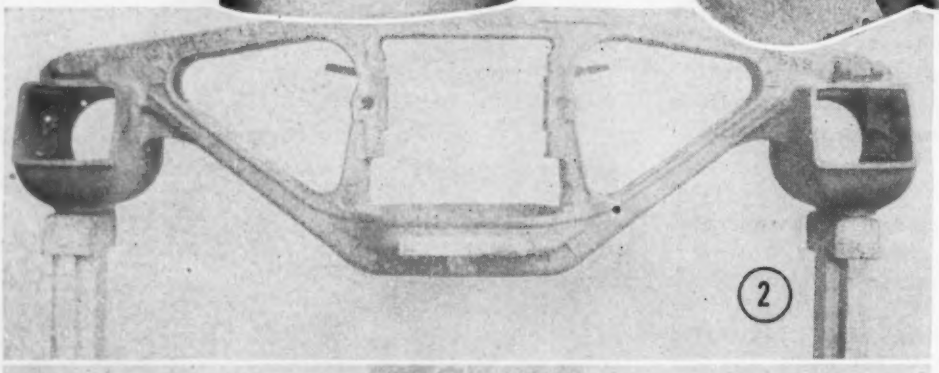
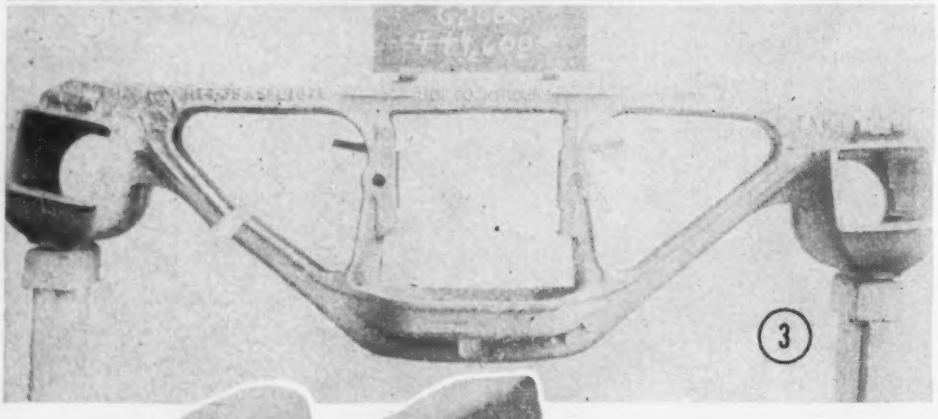
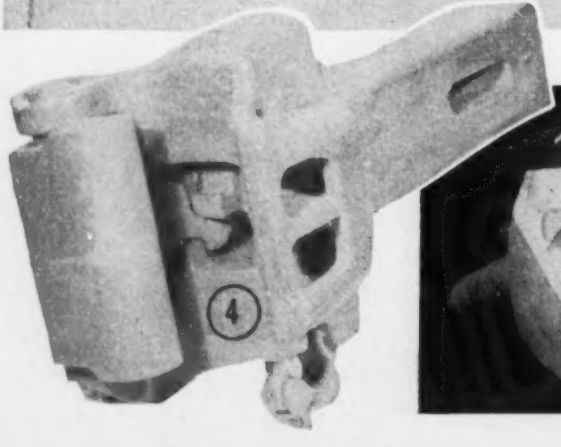






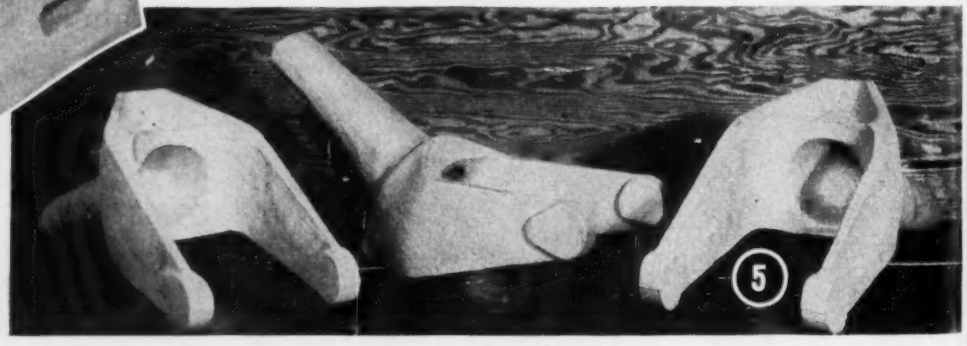


Fig. 1—Engine mount bearer tube fittings cast by the true centrifugal method. Casting weight is 10½-pounds

Fig. 2—Four wheel truck integral box high tensile side frame casting, 460 pounds total weight

Fig. 3—Same casting as shown in Fig. 2, after loading to failure in a static test. Uultimate strength was 444,600 pounds

Fig. 4—Standard "E" coupler for railway use. Total weight of assembly is 345 pounds

Fig. 5—Tail wheel caster fork castings for aircraft use. Each casting weighs approximately 43 pounds

Uses
OR STEEL CASTINGS

Instances in which steel castings are used to advantage from an engineering and economic viewpoint are pointed out. Author emphasizes that most reliable basis for accepting a casting is a simulated service test on the casting as a unit, rather than from a determination of properties in small test bars removed from casting

By JOHN A. RASSENFOSS
Research Metallurgist
American Steel Foundries
Each Chicago, Ind.

SELECTION of the most suitable means of forming steel is dependent on performance and economic considerations as well as the peculiar advantages of some of the methods for making certain classes of products. Constant improvement in each of the forming arts presents the engineer with increasingly effective and varied means for executing structural designs.

The casting of steel is inherently a very versatile and highly flexible medium for making high strength structural components. Steel castings have been made ranging in weight from a fraction of an ounce to over 200 tons. The ease of forming steel by casting allows the designer more freedom effectively and attractively to employ metal than virtually any other forming method now used.

Two Casting Methods—Steel castings are produced in a manner dependent on the design of the casting desired. There are two general methods for casting steel, the static and the centrifugal. As might be deduced from the name, the static method involves pouring molten metal into a stationary mold. The centrifugal method utilizes rotation of the mold to move the molten metal into place and hold it there during solidification. Although centrifugal casting of steel has been performed commercially in this country since shortly after 1900, it was not until the last war that it was extensively employed.

Some casting designs can be produced in equivalent quality by either method, economic considerations thus being the governing factor in selecting the method. However, some designs, particularly high strength, tube-like castings can be produced centrifugally at such quality and cost levels that the static method is eliminated from consideration.

Some engineers have gained the impression that the use of centrifugal force in making a casting regardless of its design automatically confers on it qualities unobtainable by the use of the static method. This is not so, since selection of an unsuitable design for casting by the centrifugal method will result in obtaining a casting of poor quality. It should be remembered that the centrifugal and static methods are but different means for making steel castings and when properly employed on designs suitable to the method in question, good steel castings will result.

Fig. 5 shows a group of tail wheel caster fork castings of one design made for aircraft use. A feature of the design shown is the elimination of excess weight at points where metal does not contribute to the strength of the casting in the service for which it is intended. The chemical composition, heat treatment and minimum expected physical properties of the steel used to make these forks are shown as item No. 1 in Tables I and II. All castings passed a gamma ray and dry magnetic particle test before being shipped to the customer for machining. After final machining at the customer's plant the castings were required to pass a wet magnetic particle test. (*Please turn to Page* 102)

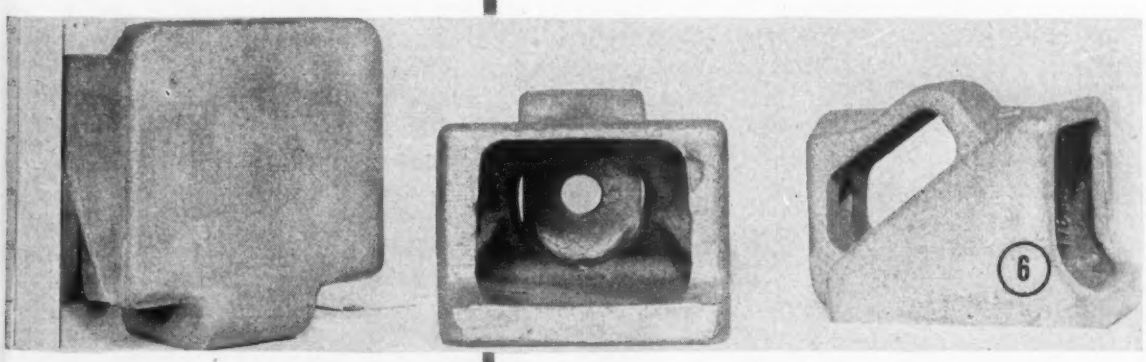


Fig. 6—Cast steel friction shoe castings. Flat faces of these 12-pound castings are flame hardened to a minimum hardness of rockwell C52.

Seen and Heard in the
Machinery Field

By GUY HUBBARD
Machine Tool Editor

STRAIGHT LINE TOOLMAKING: When the prophets of the metalworking industry look into their crystal balls along about this time of year, many of them envision the machine shops and the tool shops of the future as windowless structures flooded within with artificial light superior to daylight; with air conditioning for worker-comfort and production uniformity; with dust, fumes and smoke suppressed or removed; with noise eliminated at its source or suppressed by acoustic cushioning and absorbing; with walls and equipment painted according to the laws of color dynamics, maximum light reflection and safety; and with vibration suppressed or isolated.

About 10 days ago I saw all these things without the aid of any crystal ball. I saw them when I visited the five-acre tool plant of Simonds Saw & Steel Co., Fitchburg, Mass. That certainly is no "dream factory". It is the main plant of one of America's oldest and best known manufacturers of wood and metalcutting tools. It has been in operation for ten years. It is turning out more circular saws and band saws and straight and circular shear blades and files and various other cutting tools in two shifts, than formerly were turned out in one shift in three older plants whose combined floor area was more than 17 acres.

Although the features which I have just mentioned contribute heavily to the human and mechanical operating efficiency of this now famous "windowless, controlled conditions plant", they by no means represent the whole story. The rest of this success story involves the remarkable achievements of the Simonds production engineers in applying the principles of "straight line production".

For example, as I moved along the "catwalks" which parallel the production lines (where but in a controlled conditions plant—especially one having 100 furnaces—could one be comfortable up near the ceiling?) I saw thousands of files materialize from rough blanks to trademarked and packaged finished products in a line less than 500 feet long. There are in all eight lines—some long, some short, but all "straight lines". By cutting out lost motions, eliminating back-tracking and other inefficiencies inherent in the old "upstairs-and-down-stairs" buildings, some of the products in the course of their manufacture, travel 2230 feet less than they formerly did.

In these days when elimination of inconvenience and discomfort, and waste of time, materials, floor space or anything else, is of vital importance in industry's effort to perpetuate "the American way of life", it may be well for some of us to talk and write less about those abstract visions we see in crystal balls and more about such practical achievements as those of King Simonds and his associates.

QUALITY CONTROL: At the recent annual meeting of the American Society of Mechanical Engineers in Atlantic City, the Production Engineering division of the Society put considerable emphasis on the subject of "quality control".

C. W. Kennedy, quality control engineer, Federal Products Corp., Providence, R. I., sized up the situation in this way: "One particularly sharp image now appears in the industrial picture. It spells out 'Less work for more money.' It means that whatever you make will cost you more. For instance, collective labor action, or taxes, may well soak up whatever gains are achieved by reducing overhead, sales or distribution expenses, or by introduction of labor saving devices and methods.

"More than ever before, it is going to be necessary *to do the work right the first time.*

"Variability among things is a measurable quantity. It is easier to exercise competent judgment, to make an accurate prediction or to arrive at a correct conclusion, when debatable conditions are transformed into facts. As Lord Kelvin said: 'When you can measure what you are speaking about and express it in numbers, you know something about it.'

"The principal functions of the method of variables in statistical quality control is recognizing, measuring, calculating and evaluating variation. Action based on this should be emphasized. Without action all statistical effort is in vain."

DESIGNERS MEET PRODUCERS: One of the progressive steps taken by ASME at its 1947 annual meeting was to get the Machine Design and the Production Engineering divisions to participate in a joint session on December 2.

In undertaking the ticklish assignment of opening this session, G. C. Landis, vice president and chief engineer, Lincoln Electric Co., got right to the point by saying: "The artifical barrier which has grown up between engineering departments and production departments, has done more than any other one thing to retard the continual reduction of costs which is so essential to profitable manufacture. Too often the engineer has assumed the position of 'a little tin god' who speaks a strange language and whose word is law.

"This attitude never has been well received by men in the shop. If an engineer could design a product having the highest standard of performance, using materials of the lowest cost and greatest availability, and put together in a manner requiring the least labor and least expenditure of tools, his air of superiority might get by. However, no engineer is that smart.

"If we are to manufacture intelligently we must think of 'when who does what' rather than thinking of various functions as being subordinate to the organizational setup. All possible tooling, methods and design ideas must be fed into the product during its development stages—before the design gets blueprinted."

By R. M. LORD
Grinding Engineer
Norton Co.
Worcester, Mass.

Precision Tumbling

Metal Parts

Using specially prepared abrasives, process is successful in operations such as cleaning, deburring, forming radii, surface finishing, removing plating and paint

DEBURRING operations as well as surface finishing operations of a wide variety of miscellaneous parts such as gears, castings and threaded parts have, in the past, commonly been done on bench grinders or with small portable type grinders. In many instances these operations are being supplemented today by precision tumbling with specially prepared abrasives.

The question has been asked, "Just what advantages does precision tumbling offer over the previous methods of doing this work?" First, it is found that abrasive tumbling produces uniformity in operations such as breaking sharp edeges, producing radii to blueprint specifications, finishing operations, and also has brought about improvement in those ultra-fine finishes that are measured in microinches. It controls dimensional loss, increases wear-resistance of parts, eliminates rework and the human element and reduces manpower and manhours.

It has been found that abrasive tumbling increases the life of cutting tools and dies on parts which have to be machined after the removal of burrs. Heavier burrs can be left on work and this permits using tools longer between grinds. These heavier burrs can then be easily removed by the abrasive tumbling process with increased production and economy.

For operations where the fast cutting of untumbled abrasive is not desired, but rather a more mild finishing action is needed, this material is pretumbled at the plant to provide a product ready for

Fig. 1—Typical tumbling room where operations such as deburring and surface finishing are done. Courtesy Lundquist Tool & Mfg. Co.

Fig. 2—Variety of typical nonferrous parts suitable for finishing by abrasive tumbling

use. Process rounds off all sharp corners, producing a more blocky grain type, thus preparing the abrasive to do its job of deburring, cleaning, forming radii, and finishing. In other words, it is ready for establishing time cycles and for setting up procedures which can be maintained.

When using the finer sizes for tumbling or retumbling parts of a relatively soft material like brass or a die cast metal, it is desirable to run the barrel for about an hour with the abrasive and water only, before adding the work.

Abrasive tumbling is adpatable to small lots as well as to mass prodnction. It has proved very successful in operations such as: Cleaning stampings, castings, forgings, etc., deburring, forming uniform radii, surface finishing, finishing high precision work, improving microinch finish, finishing threaded and miscellaneous parts, removing plating, removing paint.

An appreciable saving in time cycle, manpower, manhours and miscellaneous materials can be expected. Elimination of rework and the salvaging of rejections for present bench hand operations are additional advantages of tumbling with a new tumbling abrasive known as "Alundum tumbling abrasive," developed by Norton Co.

This new product is a manufactured aluminum oxide abrasive. All of the material is true abrasive, giving a continuous cutting action without glazing and a surface finishing action without addition of any polishing compound. Its heavy weight, which is a most important factor in tumbling, combined with its toughness and hardness, insure a long and productive life.

The tumbling abrasive is available in either tumbled or untumbled form. Untumbled abrasive is used only for a first run on so-called "roughing operations." After the untumbled abrasive has been used on the roughing operation or tumbled in a preliminary run of approximately 2 hours, it can be considered to be in a tumbled condition. Untumbled material has sharp corners and edges which give a fast rate of cut but also a rougher finish.

Three essentials for tumbling are the barrel, abrasive and water. Very satisfactory results are obtained with a wood-lined, eight-sided horizontal fixed type barrel rotating at 21 revolutions per minute. Available barrel sizes vary in load capacity from one to six compartments. The size to use depends chiefly upon the volume of work to be tumbled. Barrel speed for best tumbling results should not exceed 24 revolutions per minute.

Grit size or mixture of sizes used in the operation should be such that the abrasive will reach all of the recesses, fillets, angles and slots, without becoming wedged in any part of the work.

Amount of abrasive needed for the load of work to be processed will depend entirely on the type of barrels being used and the material being finished. An average load usually consists of three parts of abrasive to one part of work by volume. The total load in all cases and regardless of the amount of parts being processed, should reach up to one-half to two-thirds of the inside of the barrel or compartment used. On large production lots, two to four parts of abrasive to one part of work by volume is a good average ratio.

Volume of water is very important in controlling the action in the barrel and on the results obtained. Decreasing the amount of water will speed up the grinding action and reduce the time cycle but will produce a rougher finish.

Increasing the amount of water will retard the grinding action and produce a smoother finish. Thus, operations can be run at low water level for rapid grinding or roughing. By adding water to the same mixture, finishes can be improved further, employing a time cycle determined by the finish requirements.

Cleaners and compounds are added to the load of abrasive and water for the purpose of giving "color" or for cleaning the parts preliminary to plating. Some are alkaline, others have an acid reaction and still others are completely neutral. The choice of cleaner or compound depends upon the material being processed and the finish requirements. It is very important that the correct type of cleaner be selected for a given job.

Very satisfactory results are obtained in preventing any subsequent rusting or corrosion by slushing the tumbled (*Please turn to Page* 124)

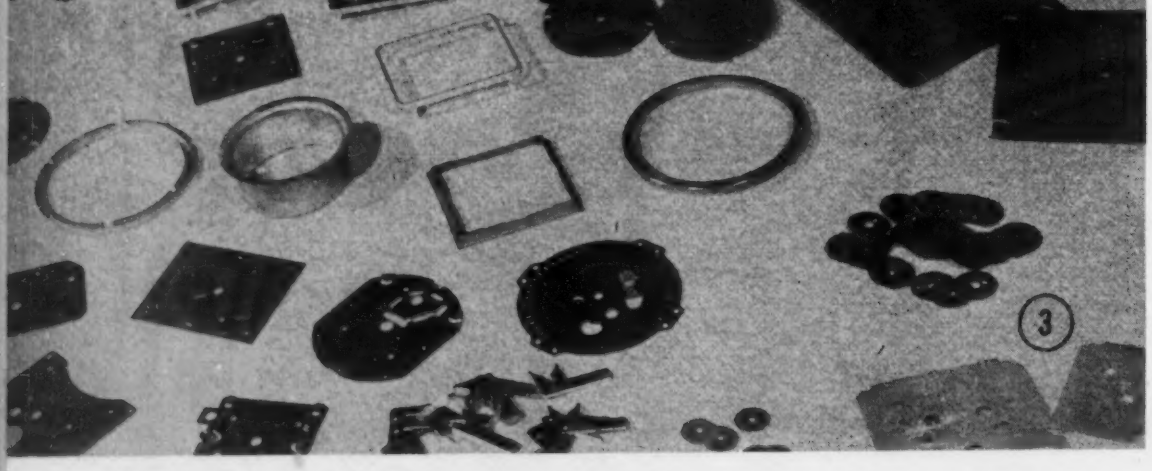


Fig. 3—Assortment of stampings that have been deburred and finished by tumbling. Courtesy Telechron Inc.

PLANNED HANDLING

. . . steps up materials flow and "expands" chain plant by condensing space

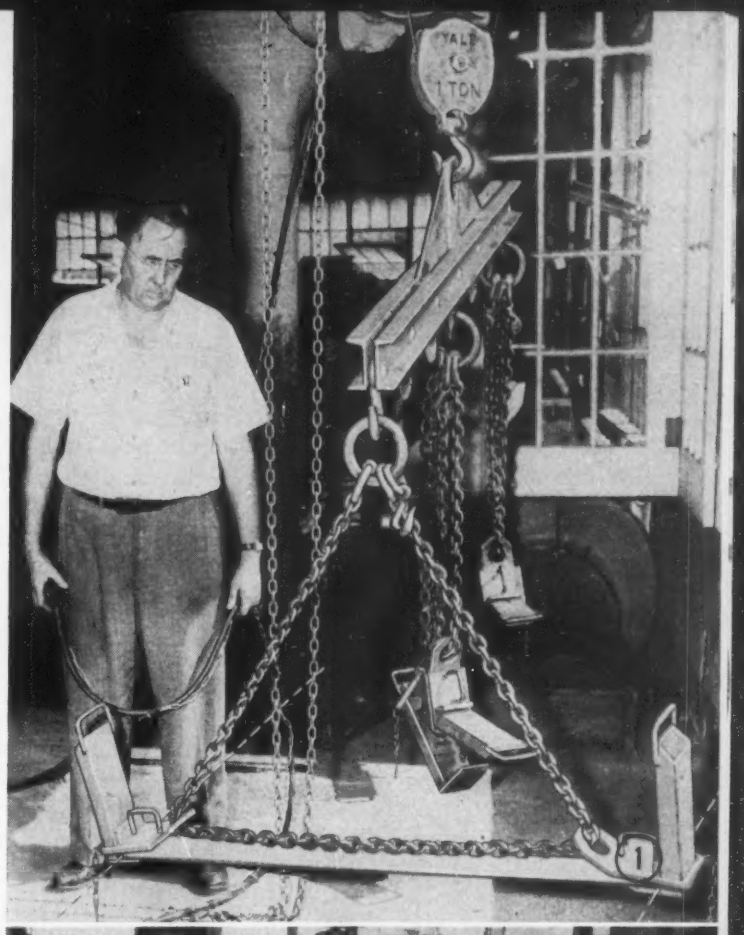
By R. O. ERICKSON
Material Handling Supervisor
Morse Chain Co., Division of Borg-Warner Corp.
Ithaca, N. Y.

RECENT revisions in the materials handling system, many of them in the postwar reconversion period, have speeded handling, added space, and cut costs at the Ithaca, N. Y. plant of Morse Chain Co., manufacturers of roller, power, and automotive chain.

Time required to hoist a given amount of sheet steel to an upper story was cut from about 8 hours to 1 hour. By tiering pallets and skids, available storage space was increased three times. An electric hoist and special pickup element facilitated receiving operations; shipping methods were improved by installing a scale as an integral part of the shipping room roller conveyor. Waste handling, loading and unloading elevators, transporting sprockets, and other miscellaneous handling operations were studied and assigned to the new fleet of fork trucks.

Receiving Sheet Steel—Sheet steel is hoisted to a third story sheet metal department by means of a 1-ton electric hoist which travels on a beam extending out over the plant yard. A long cable permits the operator to control the raising and lowering of the load (by push-button control) when the hoist is at the far end of the beam.

An interesting handling tool for picking up the sheets is shown in Fig. 1. Previously, a chain was wrapped around the stacked sheets and the hoist hook attached to the chain. This caused the ends of the stack to droop when lifted, deformed the steel and made it difficult to handle. The new yoke-like hook attachment has three pairs of grips which grasp the sheets in three locations along each side of the stack and thereby hold the sheets stiff during hoisting operations. (*Please turn to Page* 112)



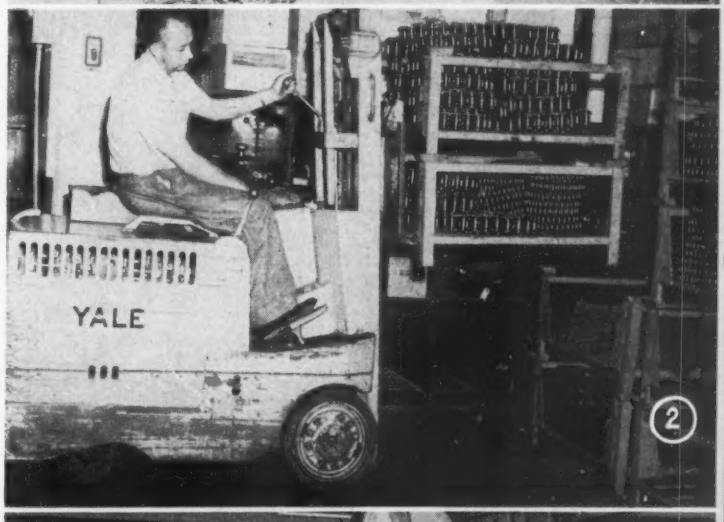
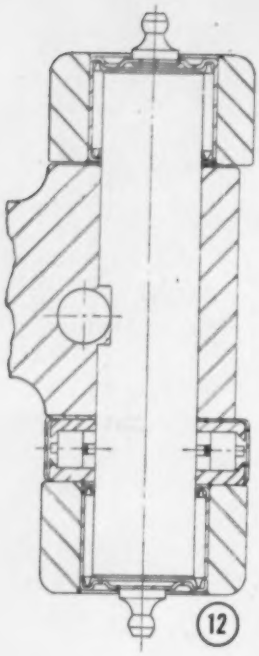


Fig. 1—Hoist with special pickup attachment for sheet steel. Adjustable clamps grip stacked sheets in three locations and prevent bending during hoisting. Hoist travels on beam out over plant yard

Fig. 2—Special tiered skid bins for assembled chain add storage space, make chain easily identifiable and accessible

Fig. 3—Scale platform makes up a section of the shipping department conveyor. Cartons are weighed for shipment without being taken off the conveyor



ANTIFRICTION BEARINGS

By L. E. BROWNE
Associate Editor, STEEL

PERFORMANCE standards, unknown but a few years back, are being required of antifriction bearings with unprecedented demand. New postwar equipment for the nation's industrial plants is designed for the application of these types of friction-reducing units more extensively than ever before.

To meet rapidly expanding applications over a wide range of operating conditions at higher speeds and heavier loads, versatility in bearing and mounting design to fill demand performance in modern machinery is a progressive development. This versatility is found in the needle bearing as indicated by the broad and widening range of applications possible and the increased use of the type wherever shafts and wheels turn.

Through improved design and lighter, stronger materials, operating and fabricating costs are being reduced by lowering product weights, and in the anti-

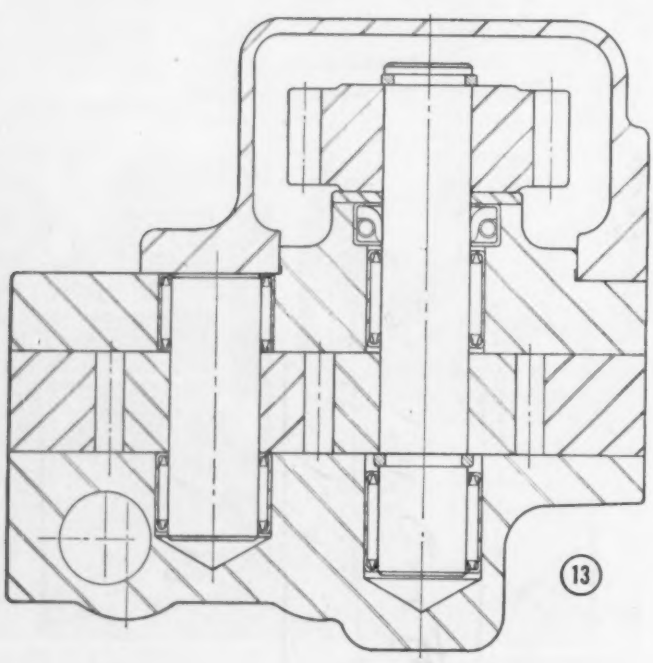
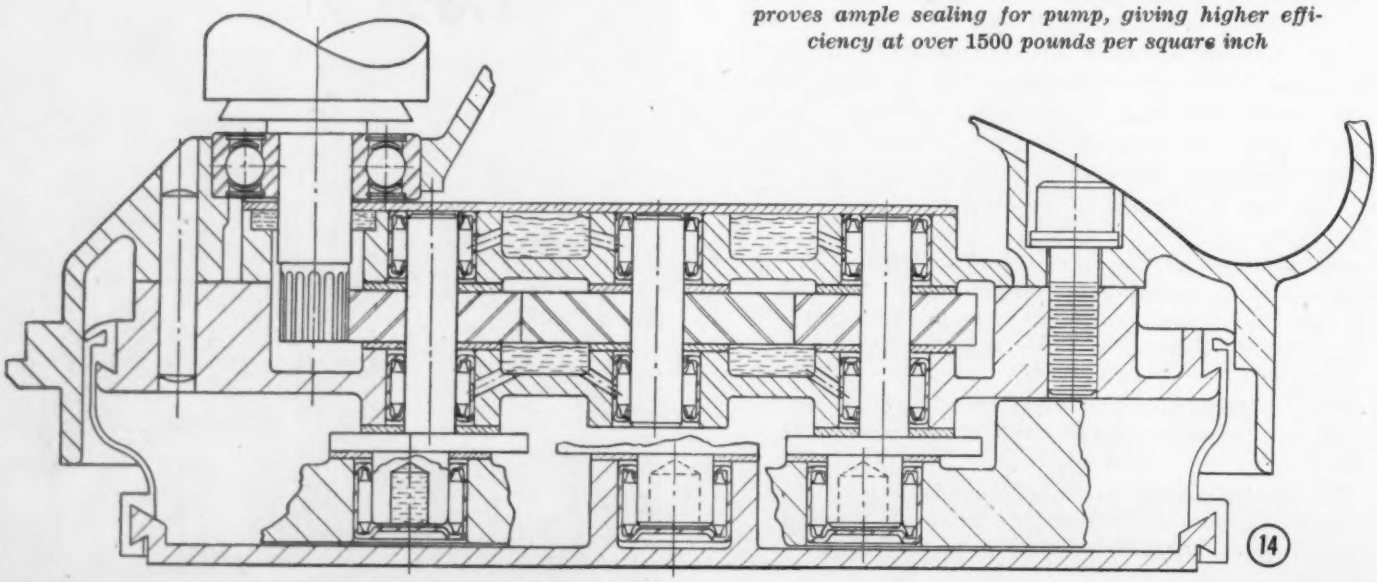


Fig. 12—*Needle bearing application in a typical automotive kingpin, press-fitted into steering knuckle. This eliminates frequent rebushing of knuckles*

Fig. 13—*Needle bearing design and application for a high-pressure hydraulic pump used to operate farm tillage equipment. Small outside diameter proves ample sealing for pump, giving higher efficiency at over* 1500 *pounds per square inch*



This third part of the current series is devoted to needle bearings and the part they play in the design of various types of industrial machinery

friction bearing field, the needle bearing occupies an important place in this endeavor. Small diameter rollers require little radial space and bulk of an inner race or ring can often be eliminated in mounting, since many needle bearings are designed to operate directly on a hardened shaft. Unit construction and simplicity of design lower installation, assembly and mounting costs and high antifriction performance permits less power consumption in many instances. Power economy and compactness in the design make possible the use of a smaller motor in numerous applications.

In addition to high radial capacity, obvious advantages of needle bearings as applied to an increasing number of applications, include low coefficient of starting and running friction; less radial space than bearings of comparable capacity; efficient lubrication, requiring slight service attention; and simplicity in design, construction and mounting.

In modern farm machinery, among many other industries, including automotive and textile, the needle bearing is making outstanding strides in acceptance, also in materials handling and hauling equipment where the relative cost of operation goes down as ratio of load to weight increases.

Needle bearings are designed for mounting with or without an inner ring, depending on facilities for heat-treating shafts, available installation space and other economies. The shaft thus serves as the inner race when the latter is omitted and in that case the shaft should be hardened to at least rockwell C 60, and machined to the limits and finish that are necessary.

Operation of needle bearings at higher temperatures and speeds, as in other types, has practical limitations in ability of lubricants to take care of high temperature operations. This is more a question of lubricant than of bearing material or design. A needle bearing assembly with a carbon steel shell might be expected to lose load capacity around 350° F since this material may begin to lose hardness at approximately that temperature.

If parts are made from other materials, a thoroughly-hardened raced assembly, for instance, and

Fig 14—*Value of compact needle bearing is shown in this cross section of a typical hand sanding machine. Straight-through housing bores are used*

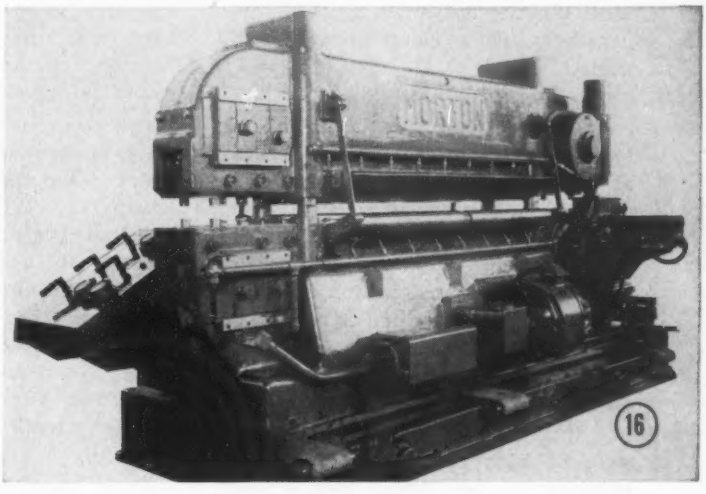


Fig. 15—*Function of these bearings is to guide and support two "I" section ram members on a machine removing flash from both top and bottom of a steel strip at the same time with but one pass*

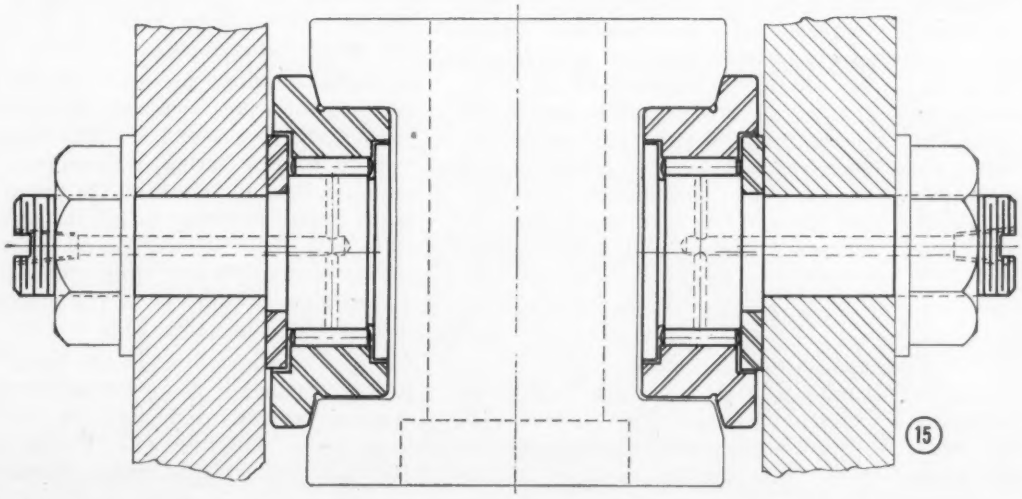


Fig. 16 — *Forty-eight or more cam follower type bearings are used in this machine designed to remove flash from steel strip. Load on each bearing varies and ram members reciprocate simultaneously at* 80 *feet per minute*

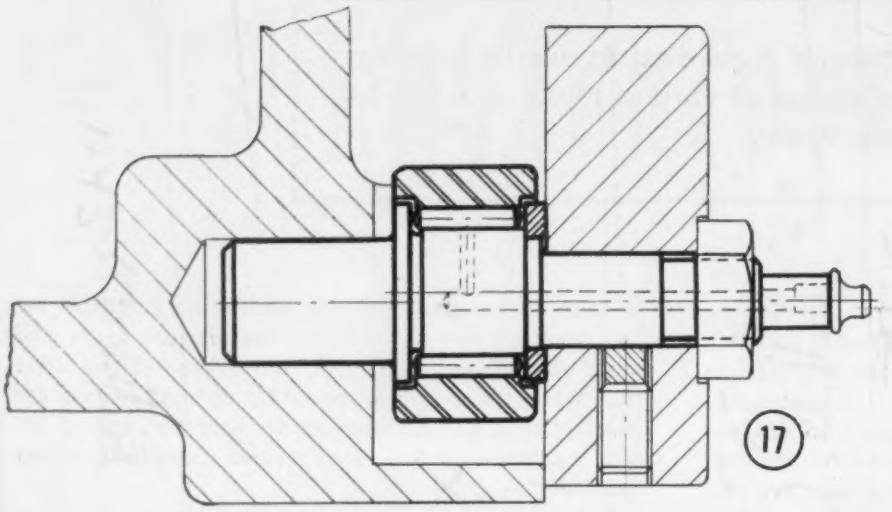


Fig. 17—Special cam follower horizontal mounting. As used in the design for a portable horizontal drilling and tapping machine in conjunction with standard vertical mountings, these bearings are no longer cam followers exclusively, but are also guide and support rollers

holding hardness to much higher temperatures, it is possible to operate bearings at higher temperatures and speeds without loss in load capacity. While some bearing engineers question the ability of grease-lubricated bearings to operate much above 250° F, oil-lubricated assemblies operate at much higher temperatures under comparatively light loads.

There is also high-speed experience with needle bearings; in one test installation this type operated at 50,000 revolutions per minute for more than 3 years with little wear, indicating needle bearings can be operated at high speeds, depending on load, precision installation, lubrication and operating conditions.

Low needle bearing coefficient of starting and running friction is important in oscillating service, involving intermittent starting and stopping at high frequency. This type occupies no more space than a plain bushing and provides greater area of bearing surface than can be obtained in the same space with other bearings. There are also numerous successful applications of needle bearings pressed directly into phenolic or rubber compound housings, notably in rollers similar to cam followers or casters. A bore housing approximately 0.010-inch less than the standard for metal housings is recommended, since some growth occurs after the bearing is installed.

Problem of increasing speeds confronts many metalworking industries. Builders of two-cycle gasoline engines for portable and stationary pumps, outboard motors, air compressors, generators, portable saws and like equipment are included and the application of needle bearings in this field is noteworthy. Because of higher speeds and heavier loads, bearings at crankpin and wristpin points especially are receiving particular attention. For this type of application, the needle bearing is having increasing acceptance. It has long been recognized that the use of antifriction bearings in these locations would be advantageous.

Before needle bearings were applied, space limitations tended to restrict designers to the use of plain bushings. Majority of two-cycle gasoline engines are lubricated by adding oil to the fuel. Difficulties involved in lubrication of plain bushings indicated that unless an antifriction bearing could be found for space, speed and cost limitations encountered, further progress toward higher speeds and efficiency was doubtful.

Plain bushings in crankpin and wristpin positions are subject to sharp rises in temperature as speeds increase with a consequent decline in engine efficiency and bearing life. No solution is afforded by the addition of more lubricant in proportion to the fuel. Engine efficiency is further reduced by the production of more carbon formation in the piston. The answer has been antifriction operation to lower lubrication requirements.

This range of engineering and operational requirements is a natural application for needle bearings, a compact size type, with high radial capacity, high speed rotation and oscillation, efficient lubrication and low cost. Among the first to fail in high-speed, two-cycle engines are wristpin bearings. Oscillating motion with loads concentrated in one direction makes it difficult to maintain the oil film for best performance in old designs.

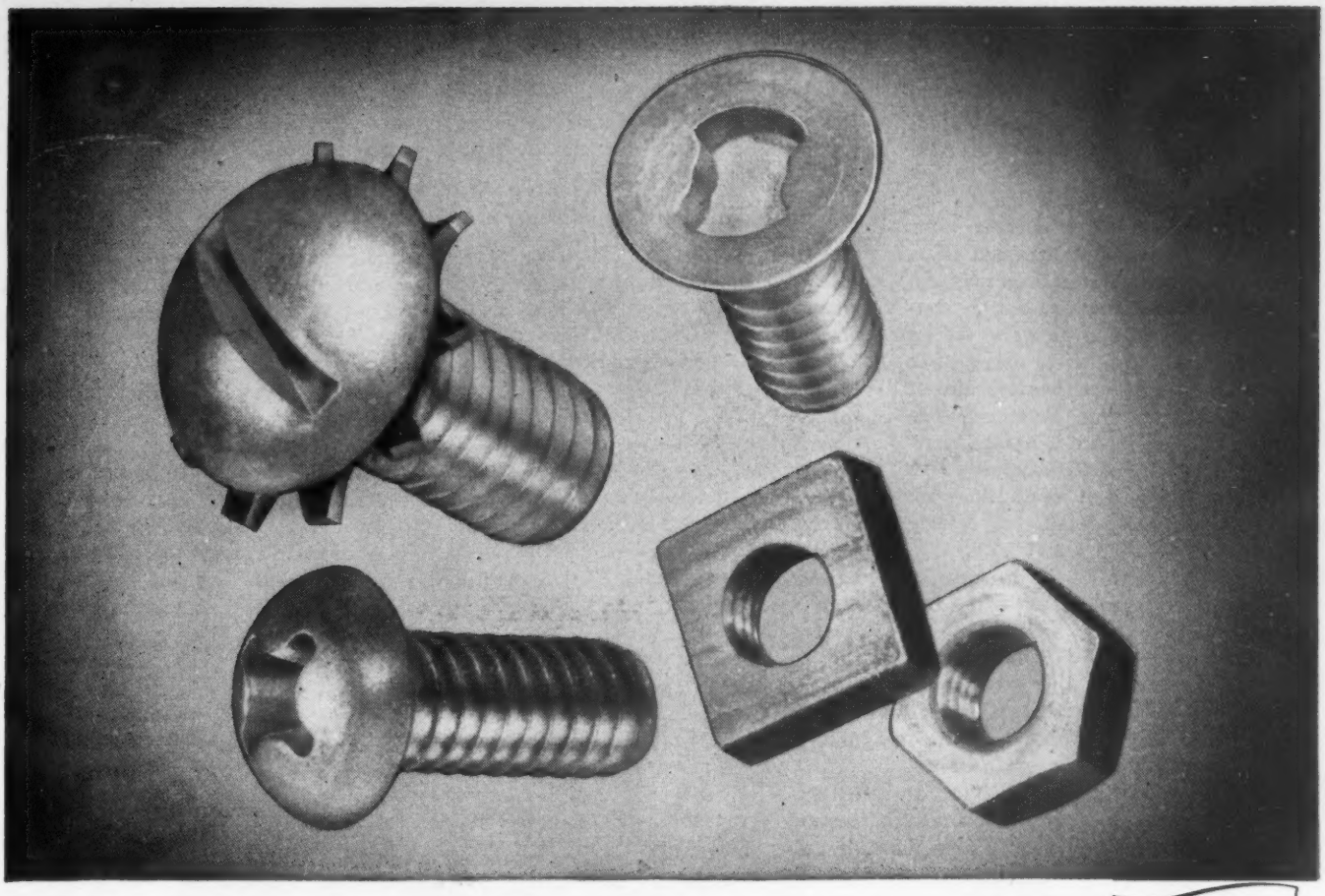
Application of the needle type for wristpin bearings has given satisfactory solution. Starting coefficient of friction is about the same as running coefficient of friction, an advantage of special importance for oscillating motion, starting and stopping at high frequency through small amplitude. Also the large number of small-diameter precision rollers gives a large area of bearing contact surface and higher capacity than a bearing of comparable size. Efficient lubrication is assured by the turn-in lips of the outer shell, forming a reservoir to conserve oil.

In one widely used design for wristpin applications, two "G" series Torrington needle bearings are pressed into the eye of the connecting rod; this series is precision ground on the outside diameter, permitting closest tolerances and running clearances. This design also allows ease of lubrication and permits maximum connecting rod stability. A single bearing may be used on the wristpin in smaller two-cycle engines, but couple loading on a single bearing may concentrate stress on the ends of the rollers, accelerating wear. In a two-bearing design, couple loads are distributed over the full length of the rollers of the stressed bearing.

For the crankpin location, selection of the proper bearing design is influenced as to whether a single unit type or built up crankshaft is encountered; in the former case Torrington standard crankpin rollers are often recommended and in the latter, needle bearings. The former allows a generous fillet at the crankpin with the advantage of added strength. These crankpin rollers are used with slip cap rods; by employing body-fitting bolts, acting as dowels, proper alignment is obtained.

Needle bearings are used in one-piece connecting rods on built-up crankshafts, assemblies including two oil holes. During engine operation centrifugal action of the vapor mass passes particles of oil through slots onto the rollers. The oil holes are located under saw slots provided at the sides of the eye at the crank end of the connecting rod.

Concrete advantages in the use of needle bearings in two-cycle gasoline engines include reduction in the quantity of lubricant; with less oil in the fuel there is less carbon forma-



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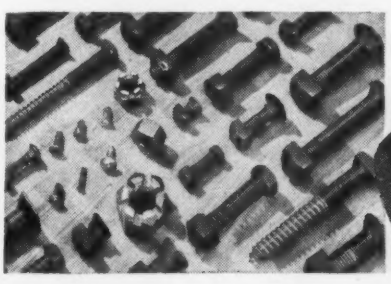


tion in the piston with longer spark plug life. Less heating of the engine gives increased operating economy and longer engine life. From the same cubic inch displacement, improved mechanical efficiency with increased horsepower output is secured. Even at higher speeds increased bearing life with less wear and noisy operation is attained.

Needle bearing design does not provide for thrust capacity, but in conjunction with thrust washers, it can be successfully applied to carry light thrust loads. Where heavier thrust loads are encountered, it is frequently possible to combine a needle bearing with another antifriction type to carry the thrust load and utilize the high radial capacity of the needle roller for the radial load.

Needle bearings in some designs are highly adaptable as cam followers. Cam follower application requires the use of bearings designed for high load capacity, at low speeds usually, and exceptionally strong outer races are necessary to meet this requirement. Bearings are specifically designed for this type of service with permanently attached inner races, or assembled on studs.

The Torrington needle bearing is an assembly comprising a full complement of precision-ground hardened needle rollers enclosed in an accurately formed heat-treated shell which serves as the outer race for the bearing. This assembly makes possible an extension of the use of the needle rollers which are commonly used in automobile transmissions to other applications where the individual production requirements are not too high or where hardened and ground parts are not usually used in construction.

Used in Automotive Transmissions

Use of needle rollers in automotive transmissions has been quite general for 15 years. This is made possible by the use of heat-treated gears and shafts which permit the easy installation of a complement of rollers, making an effective antifriction bearing. These needle rollers are capable of carrying very heavy loads at high speeds and have really solved the transmission designers' problems where it is necessary to get a transmission capable of carrying high torque at low cost. In industrial applications, such a natural set-up seldom exists and for this reason the needle bearing with its hardened outer race makes an inexpensive and handy assembly.

An early application is that shown in Fig. 12 with the use of needle bearings in a typical automotive kingpin. Needle bearings eliminated the necessity for frequent rebushing of steering knuckles, aided the ease of handling a car when parking as well as providing stability at high road speeds.

Application is simple in that the kingpin is a straight centerless-ground heat-treated pin and the needle bearings are merely press-fitted into the steering knuckle which has been through-broached to the proper size. In the design shown, a closed end type assembly with integral grease fitting is used, therefore making an economical antifriction bearing set-up. No welch plug, retaining wires or rings are required since the needle bearings are firmly seated and the continuous rolling action tends to seat the outer race or shell more firmly in its housing.

Another interesting application of needle bearings is shown by drawing, Fig. 13, of a high pressure, hydraulic pump used to operate farm tillage equipment. Increased use of hydraulic operating devices has created a demand for reliable hydraulic pumps as fixed attachments to tractors. The design shown is for such a pump.

Pressures of 1500 pounds per square inch are easily handled and the use of needle bearings results in pumps having longer life. Use of the needle bearing, with its small outside diameter, provides plenty of sealing for the pump, resulting in higher efficiency. The large shaft diameter which can be accommodated with this minimum outside diameter results in decrease in shaft deflection which again raises the gear pump efficiency.

Antifriction qualities of needle bearings are more firmly established when hydraulic pumps are used as motors. Use of needle bearings in hydraulic motors results in the motor having quite uniform torque at zero and low speeds—a condition which is practically impossible to obtain when conventional bearings are used.

Simplicity of design incorporating Torrington needle bearings is shown in Fig. 14. This cross-section of a typical hand sanding machine shows the value of the compact needle bearing, ease of manufacturing and assembly resulting from the use of straight-through housing bores, use of straight shafts which can be simply ground on conventional centerless grinders and use of closed end bearings which retain lubricant at the crank throw to operate the gyrator plate for the sander. Lubrication is afforded through oil holes in the bearing shells and pockets which

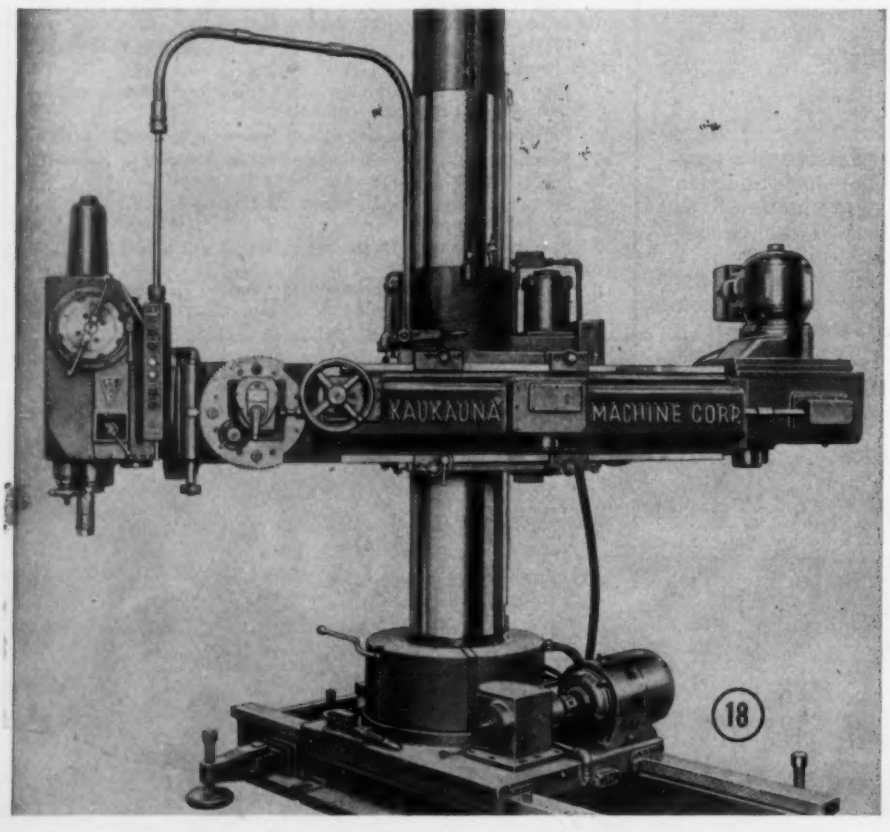
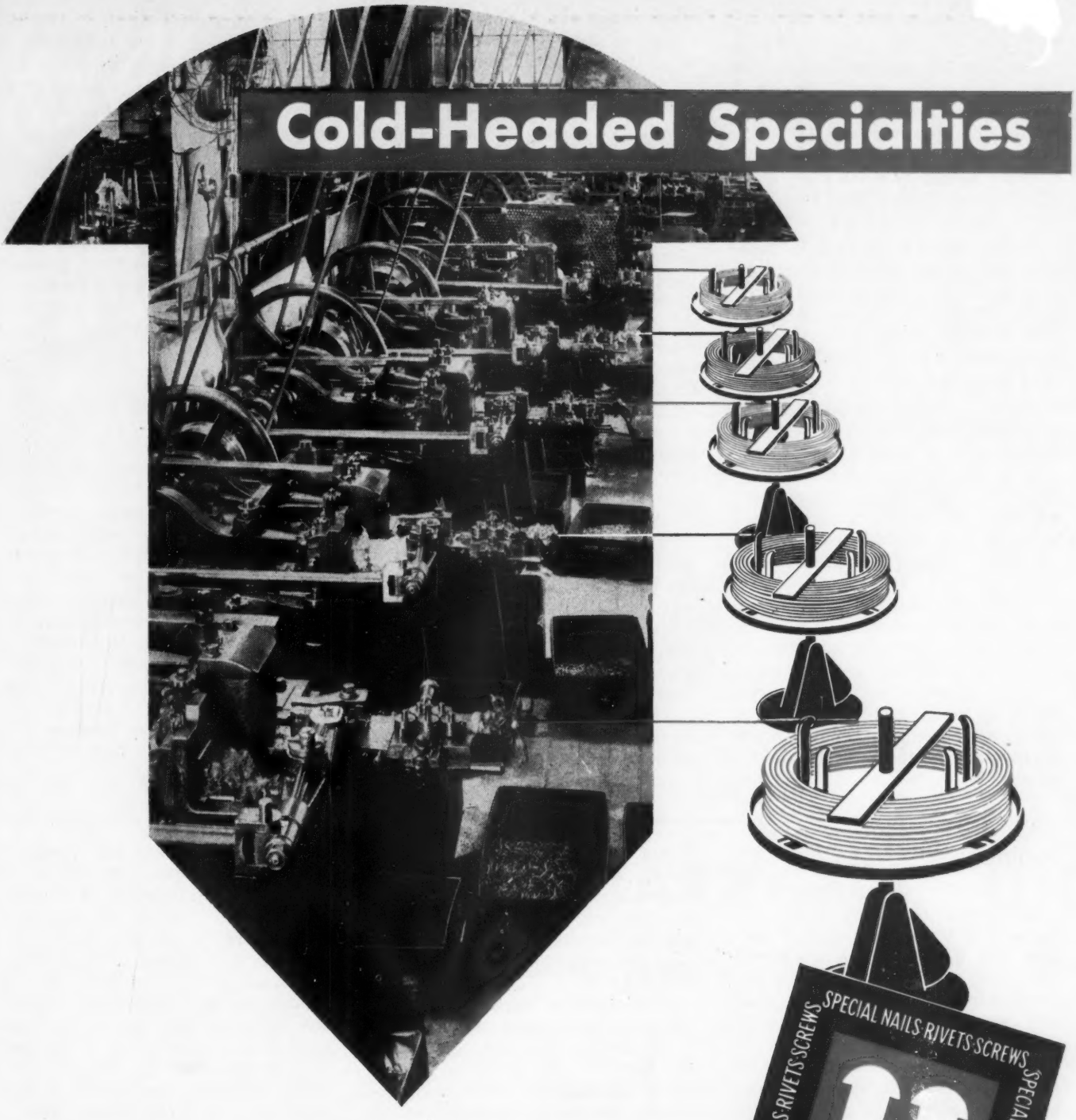


Fig. 18—Unusual design incorporating 16 standard and special Multirol bearings makes it possible to operate the spindle of this portable horizontal drilling and tapping machine in any conceivable angle. Courtesy Kaukauna Machine Corp.

Cold-Headed Specialties



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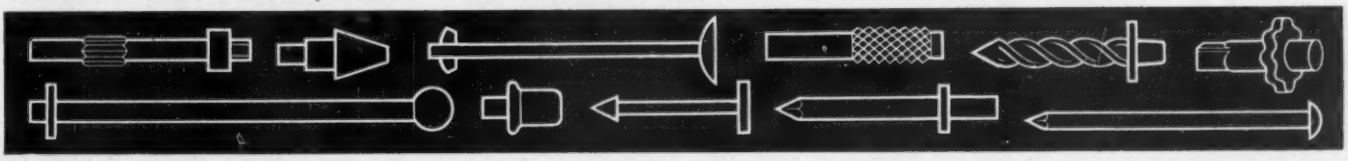

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hold woolen pads used as oil storage.

The cam follower type is ideal for many heavy-duty applications and 48 or more special McGill Multirol bearings of the design shown in Fig. 15 are being used in the heavy-duty rolling mill type flash trimmers manufactured by Morton Mfg. Co., Muskegon Heights, Mich., Fig. 16.

This machine removes flash from both the top and bottom of a steel strip up to 96 inches in width at the same time and with only one pass. This is accomplished by the use of five 1-inch wide tools mounted in each ram.

Function of these special bearings is to guide and support the two "I" section ram members which reciprocate simultaneously at a speed of approximately 80 feet per minute. Consequently the outer race of the bearing rotates at about 100 revolutions per minute and at the same time reverses direction of rotation. There are four rows of these bearings, two rows for each ram, (machine end view Fig. 16), with the bearings secured in horizontal bored holes in the solid frame of the machine and drawn up tightly end-wise with nuts. Open portion of the "I" is about 1/64-inch wider than the bearing diameter.

Since each bearing has the special feature of 1/16-inch eccentricity between the extended portion of the inner stud and the roller raceway, it is possible to adjust each bearing radially to carry its share of the load. This feature will provide proper adjustment as well as provision for take-up for wear. In each row, half of the bearings will contact on the lower path of the "I" ram while the balance will contact on the upper path. Consequently at all times the rams will reciprocate smoothly without radial play.

Load on each bearing varies from steady to moderate shock depending upon the position of the ram in its relation to the supporting rollers and the amount of flash to be removed. Bearing construction results in a very effective labyrinth seal which is desirable since bearings operate in the presence of air blast and chips. Only occasional grease lubrication through the threaded end of the inner stud is required to keep the bearings functioning properly.

Sixteen standard and special McGill Multirol cam followers of the type shown in Fig. 17 have been incorporated in the design of portable horizontal drilling and tapping machines, Fig. 18, manufactured by the Kaukauna Machine Corp., Kaukauna, Wis.

A unique feature of this machine is ability to swivel the drilling head 360 degrees in either a horizontal or vertical plane, making it possible to operate the spindle in any conceivable angle. Also by use of the lifting bail at the top of the column, it is possible to transport the machine to large and unwieldy work pieces rather than bring the work to the machine. Attention is called through this interesting and unusual application to the fact that such bearings are no longer strictly considered exclusively as "cam followers". Their use as guide and support rollers is rapidly becoming more pronounced.

In the Kaukauna machines these bearings, mounted on the rail slide unit, are used as guide and support rollers for the two rails on which the head and speed units are mounted. These bearings are mounted for both vertical and horizontal adjustment by the use of eccentric sleeves and shafts. Speeds are slow, since the controls are hand-operated. Bearing loads will vary from steady to moderate shock, the latter not in excess of 6000 pounds. Whenever required, relubrication with a soft grease can be effected through the lubrication hole in the threaded end of the bearing stud.

(To be continued)

Engineering Uses

(Continued from Page 91)

Acceptance Based on Tests—Acceptance of these parts as steel castings was based on the results of tests performed on completed tail wheel assemblies. The tests were such as to simulate the stresses actually encountered in service on an airplane. Steel castings gave an acceptable performance in both testing and service.

Fig. 2 is a view of a four-wheel railway freight car truck side frame casting. The design shown is one of those approved by the Association of American Railroads for use in general interchange service.

Acceptance specifications are based on certain maximum deflections under specified static loads in the transverse and vertical direction. Further static specifications include a minimum elastic limit and ultimate load carrying capacity.

Table III shows the results of such tests on a casting of the design shown in Fig. 2. The nominal chemical composition, heat treatment and minimum expected physical properties of the steel used to make this casting are shown as item No. 2 in Tables I and II. Fig. 3 shows a casting after having been loaded to destruction in this test. It is to be noted that high rigidity and load bearing capacity for such a light weight structural member have been obtained.

Tests Simulate Service Conditions—Dynamic acceptance tests are made in a machine designed specifically for testing castings in a manner which simulates actual service conditions. Casting is supported at the journal boxes and three different types of loads are applied in sequence until a critical crack is started. Direction and magnitude of loads applied in a single revolution of the main load cam of this testing machine are as follows:

A vertical load equal to 250 per cent of axle capacity is applied to the spring seat of the side frame. While this load is held on the frame, a twist load is also applied to the spring seat, which equals 21.3 per cent of the axle capacity. While both the vertical load and the twist load are maintained on the frame, a transverse load representing 32.5 per cent of axle capacity is applied in one direction to the side frame columns, released and then applied in opposite direction and released.

With the final release of the transverse load, the vertical and twist loads are also removed. On the next half revolution of the main load cam the vertical load is applied, as mentioned above, the twist load is applied in the opposite direction, and the transverse load is also applied in both directions. The above cycle is repeated 50 times per minute. For the particular design shown in Fig. 2 the vertical load is 78,000 pounds, the transverse load 10,500 pounds and the twist load 6800 pounds.

Naturally all modern designs meet these dynamic test requirements with a substantial margin. In some instances where tests have been prolonged for development or information purposes, fatigue life in excess of 500,000 loadings has been recorded.

That the excellent performance of these castings in the above described test is a good indication of service performance of these parts is borne out by the excellent service of integral cast steel side frames on American railroads. Side frame failures are a rarity and such castings normally outlast the car bodies un-

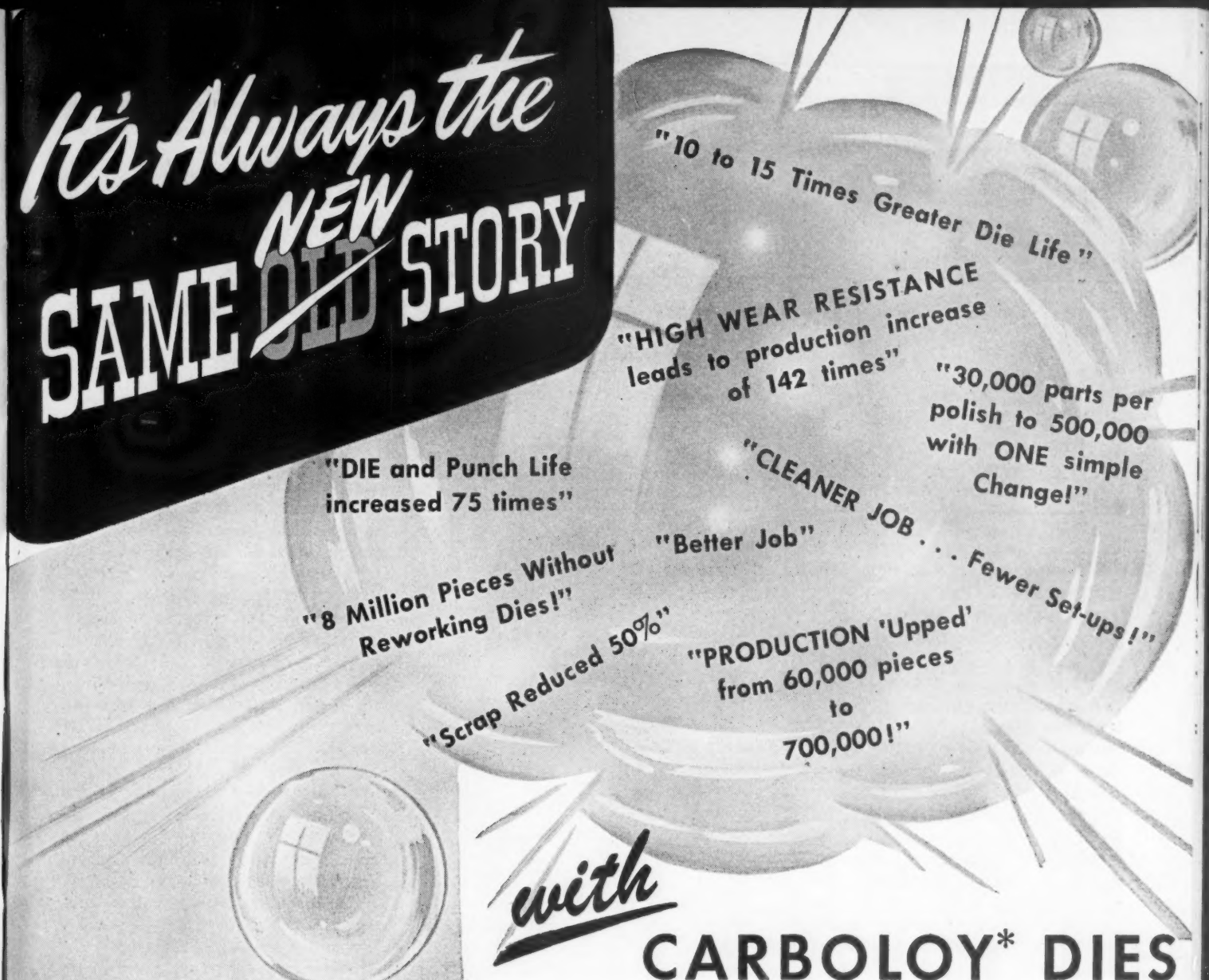
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TABLE I

CHEMICAL COMPOSITION AND HEAT TREATMENT OF THE STEELS USED TO MAKE STATIC CASTINGS

Item No.	C	Mn	Si	Cr	Ni	Mo	Heat Treatment
1. Tail Wheel Fork.....	.25	.75	.50	1.30	2.75	.25	1650° F.—air cool 1550° F.—oil quenched 1050° F.—air cool
2. Side Frame ..... Bolster Coupler Draft Gear	.31	1.65	.45	...	...	...	1650° F.—air cool 1050° F.—air cool
3. Friction Shoe	.46	1.00	.45	...	...	...	1650° F—air cool

Note: All chemical compositions shown are the desired compositions.

TABLE II

MINIMUM EXPECTED PHYSICAL PROPERTIES FOR THE STEELS AND HEAT TREATMENTS SHOWN IN TABLE I

Item No.	Ultimate Tensile Strength p.s.i.	Yield Strength p.s.i.	Elongation in 2 inches %	Reduction of Area %	Cold Bend
1. Tail Wheel Fork.....	150,000	135,000	10	20	..
2. Side Frame ..... Bolster Coupler Draft Gear	90,000	60,000	22	45	..
3. Friction Shoe	95,000	55,000	14	25	..

Note: The properties of the steels used for the side frame, bolster and coupler were measured on coupons attached to the actual castings. All other results shown were measured on coupons taken from separately cast keel block castings.

TABLE III

RESULTS OF STATIC DEFLECTION AND STRENGTH TESTS ON THE 40 TON CAPACITY HIGH TENSILE DESIGN FOUR WHEEL TRUCK SIDE FRAME CASTING

Transverse Loading*	
Deflection at 19,200 lb. load	.0755 in.
Permanent set at 38,400 lb. load	.0083 in.
Vertical Loading**	
Deflection at 72,000 lb. load	.0433 in.
Permanent set at 144,000 lb. load	.0005 in.
Elastic limit	246,000 lb.
Ultimate load	444,600 lb.

* This transverse load was applied across the vertical columns at the center of the casting while the casting was supported at the two journal boxes.

** Vertical loads were applied to the bottom of the spring seat while the casting was being supported through the journal boxes as it would be in service.

der which they are placed. When side frames are finally discarded, design obsolescence is the usual reason.

Unique Application — A rather unique application for steel castings is that of a so-called friction shoe in a special design of railway freight car truck. By exerting a constant frictional force between the side frames and bolster, friction shoes damp out the vibrating action of the coil springs which serve to support the bolster in the side frames. This damping action assures a smoother riding car. When the friction castings and springs are placed in the pockets and end of the bolster threaded through the bolster opening of a side frame, the upward force of the spring is translated by the angled surfaces of the friction casting and bolster into a force perpendicular to the flat face of the friction casting. Thus the flat face of the friction shoe is pushed against a flat spring steel plate welded to the side of the bolster opening the side frame.

Fig. 6 shows such castings ready for use. The flat friction face of the casting is ½-inch thick and the remainder of the casting varies in section thickness from 5/16-inch to ½-inch. Chemical composition, heat treatment and minimum expected physical properties of the steel used to make these castings are shown as item 3 in Tables I and II. Following the heat treatment shown in Table I the flat wearing faces of the shoes are differentially hardened to a hardness of rockwell C 52 for a minimum depth of ⅛-inch. The hardness is not less than rockwell C 47 at a depth of 3/16-inch and decreases to not more than rockwell C 37 at the back of the ½-inch thick wearing face.

Wear resistance of the hardened steel face was determined by testing actual castings in a machine which simulated actual operational wear conditions. The results of these tests and the examination of castings which have undergone actual service indicate that satisfactory wear resistance has been obtained.

It is thus seen that the use of cast steel has made possible a product which combines high wearing face hardness and wear resistance with an overall ability to resist impact stresses encountered in operating service.

Cast Freight Car Coupler—One of the outstanding achievements of the steel foundry industry is the AAR standard type E railway freight car coupler. Principal parts making up this coupler are the body, weighing 235 pounds, knuckle, 76 pounds and lock, 15 pounds, all of which are steel castings. Four other parts are forgings and malleable iron castings totaling 19 pounds. Total weight of the assembled unit is 345 pounds. The coupler body and knuckle casting shown were made of steel having a chemical composition, heat treatment and physical properties as shown in item No. 2 of Tables I and II.

These couplers are tested in a static pulling machine to determine their ultimate strength. Average ultimate strength of four high tensile knuckles in one representative test was 597,700 pounds and of four coupler bodies 727,400 pounds. This latter strength was obtained by substituting a special knuckle which had been quenched and tempered to a tensile strength sufficient to produce failure of the coupler body.

It will be noted that the ultimate strength of the knuckles was over 100,000 pounds less than that of the coupler bodies. This margin is sufficient to insure that under excessive loading, failure will occur in the knuckle, and the coupler can be quickly repaired by application of a new knuckle.

These couplers are a pointed illustration of the versatility of the steel casting process. The intricate contours and recesses of the knuckle, lock and coupler body are all cast to final shape. The pinholes and slots for assembly are cast to final size. Yet these cast parts are assembled into a reliably working mechanical unit which has the pulling strength as shown above and which must withstand the abuse of heavy impacts in railroad use.

Designer and Foundryman Should Co-operate—In considering the use of cast steel construction it is to the advantage of the designing engineer to consult with the foundryman before completing final designs. In this manner the greatest possible gain can result from the use of the casting process. Virtually any method of fabrication is at its best if the engineer had it in mind when designing the structure under consideration. Steel castings are no exception to this rule. Cast steel construction can serve well under design conditions for which it was not intended but it serves best when the designing engineer takes full advantage of its particular abilities in making the original design.

Centrifugally Produced Castings—An illustration of the results obtainable by the true centrifugal method are the properties obtained in short length tube castings. Considerable experimental work was done by the author's company on tubing 7¾-inch long and having an outside diameter of 6¾-inch. The as-cast wall thickness of such castings was approximately 1¼-inch. These castings were made in a cast iron mold rotated about a vertical axis.

Table IV shows typical results obtained from various types of physical test specimens removed from the walls of two such castings after the heat treatments shown had been

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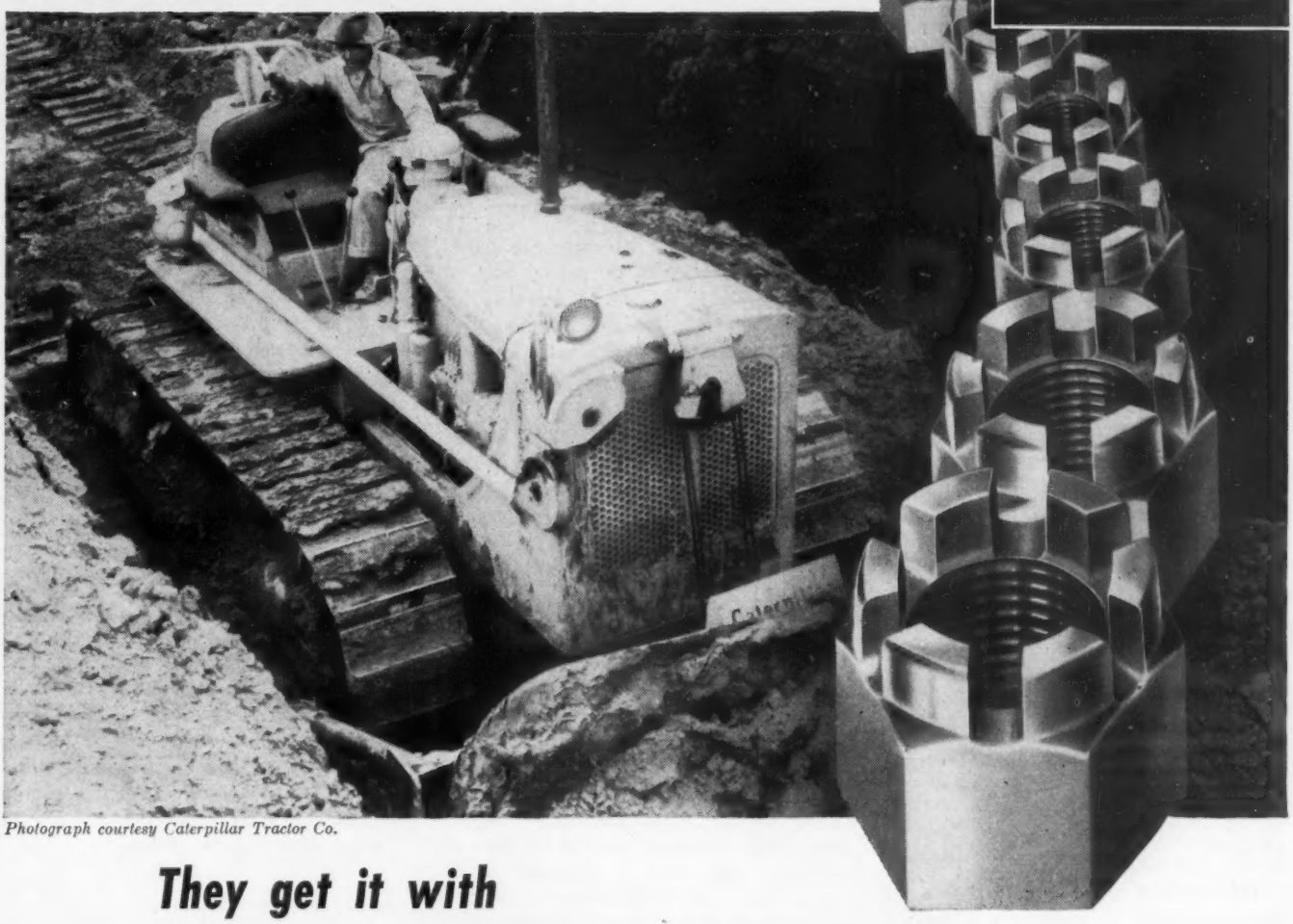

Photograph courtesy Caterpillar Tractor Co.

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TABLE IV

CHEMICAL COMPOSITION, HEAT TREATMENT AND PHYSICAL PROPERTIES OF TWO CENTRIFUGALLY CAST TUBES

Dimensions of Tubes Before Quenching Treatments:

6¾ in. Outside diameter
7¾ in. long
¾ in. wall thickness

Chemical Composition

Type of Steel	Heat No.	C	Mn	Si	P	S	Cr	Mo	Ni	Special Deoxidation
SAE 4140	3673	.43	.87	.42	.014	.028	.93	.22	..	5 lb. high carbon ferrotitanium per ton
N. E. 8740	3674	.41	.93	.45	.019	.029	.57	.26	.55	ferrotitanium per ton

Heat Treatment

1650° F.—2 hr.—air cool
1250° F.—2 hr.—air cool
1575° F.—1 hr.—oil quench
900° F.—2 hr.—air cool

Physical Properties

Type of Steel	Heat No.	Ultimate Tensile Strength p.s.i.	Yield Strength p.s.i.	Elongation in 2 in. %	Reduction of Area %	Brinell Hardness No.	Izod Impact (ft. lb.)	Cold Bend
SAE 4140	3673	179,167	170,833	11.2	35.1	375	13	51°
N. E. 8740	3674	177,167	169,500	12.5	32.8	375	14	56°

Note: Each Izod value is the average of six tests. All other values are the average of three tests. Tensile test specimens were standard .505 in. diameter. The cold bend tests were made on specimens ¼ in. x ¾ in. x 7¾ in.

given the castings. The steel compositions shown are nominally SAE 4140 and NE 8740. It will be noted that tensile strengths in excess of 177,000 pounds per square inch have been obtained. Even at this strength level relatively good elongation and reduction of area values resulted.

The centrifugal casting process has demonstrated its worth in the manufacture of aircraft cylinder barrels, high explosive gun tubes, high alloy tubing and other related products. It would seem that the process could serve other useful purposes, one of which might be the furnishing of small quantities of short length, relatively heavy walled tubing of special analyses.

It was found during the war that tube-like casting desings need not be perfectly symmetrical about a single axis to be made successfully by the centrifugal method. Fig. 1 shows centrifugally cast engine mount bearer tube fittings of a design used on the Curtiss-Wright P-40 airplane.

When cast steel parts are considered, those who investigate them frequently note that tensile test specimens removed from actual castings have lower elongation and reduction of area values than do specimens removed from the direction of hot work in rolled or forged parts of comparable composition, heat treatment and tensile strength. This behavior is often taken as an indication of the inferiority of the cast material.

Tests indicate that too much emphasis has been placed on high tensile bar ductility values. The results obtained from physical test coupons removed from a part in question are useful only if they accurately predict the service performance of the part as a unit. In view of this fact and the above example, it would seem wise whenever possible to base acceptance of new constructional materials on performance as a usable unit rather than on small test coupons.

From data presented by the author at semi-annual meeting of the American Society of Mechanical Engineers, Chicago, June, 1947.

Importance of Scrap Stressed in Book

The Story of Scrap, by Edwin C. Barringer; fabricoid, 152 pages, 5½ x 8½ in.; published by Institute of Scrap Iron & Steel Inc., 1536 Connecticut Ave. N. W., Washington 6, D. C., for $2.75.

The vitality and color of the scrap iron and steel industry are interestingly mirrored in a new book, "The Story of Scrap," authored by Edwin C. Barringer, executive secretary of the Institute of Scrap Iron & Steel Inc., Washington, and published by the institute.

While the author modestly says it is not a textbook, is is without question educational, particularly to the layman who has a vague conception that scrap is junk acquired by an itinerant collector. By portraying the importance of ferrous scrap in an industrial age the book helps promote admiration and respect for the scrap industry and constitutes masterful public relations on the part of the institute.

Although some of the information contained in the book will not be new to scrap dealers they will be intrigued by the history unfolded in an interesting fashion. And, they undoubtedly will have a feeling of pride and satisfaction as they read how the industry has earned a station of importance and respect.

The 152-page book of 15 chapters was not intended as a manual on scrap yard operation or metallurgy but rather its aim is to portray the basic facts of the scrap industry coupled with a semi-technical description of the leading scrap-consuming processes. The new book is a revision and amplification of the booklet, "The Story of Scrap," published by the institute in 1939.

The author interestingly outlines the development of the scrap industry from its early days to its present multimillion dollar annual sales stature and discusses the source of scrap and the role of dealers and brokers.

To help tell the story of scrap, the author provides some salient statistics in table form. Adding further to the value of the book is a chapter listing specifications for the various grades of scrap.

Use of Ferrophosphorus Described in Booklet

Ferrophosphorus, an alloy of iron and phosphorus which has the ability to increase the fluidity of gray iron, is the subject of a booklet available from Hickman, Williams & Co., Chicago, distributors of the product, made by Victor Chemical Works, also of Chicago. Also conveying resistance to wear and to growth to gray iron, the material is analyzed and its use described in the new publication. Listed are several typical cupola mixes containing ferrophosphorus as part of the cupola charge.

List of Foreign Inventions Published

A list of inventions for which the United States government holds the right to file foreign patent applications was issued recently by the Office of Technical Services, Department of Commerce, Washington 25, D. C. Copies of the list may be obtained by those interested in securing foreign patent rights for such inventions in the name of the government.

Inventions of interest to the metalworking industries include the following: Apparatus for corrugating thin sections; method for handling molten magnesium; melting magnesium and magnesium base alloys; silver plating process; wire drilling of diamond dies, conditioning of molten metal; improved adhesion for electroplated coatings; superheating magnesium alloys for fine grain; electrolysis of light metals; ingot scalping machine; etc.

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Fig. 1 (left)—Bottom view, first welded design of beam; top, welded design developed after functional analysis of beam

Fig. 2 (below)—Poidometer is a continuous weighing machine which controls weight of material allowed to flow onto a moving belt

WELDED BEAM DESIGN

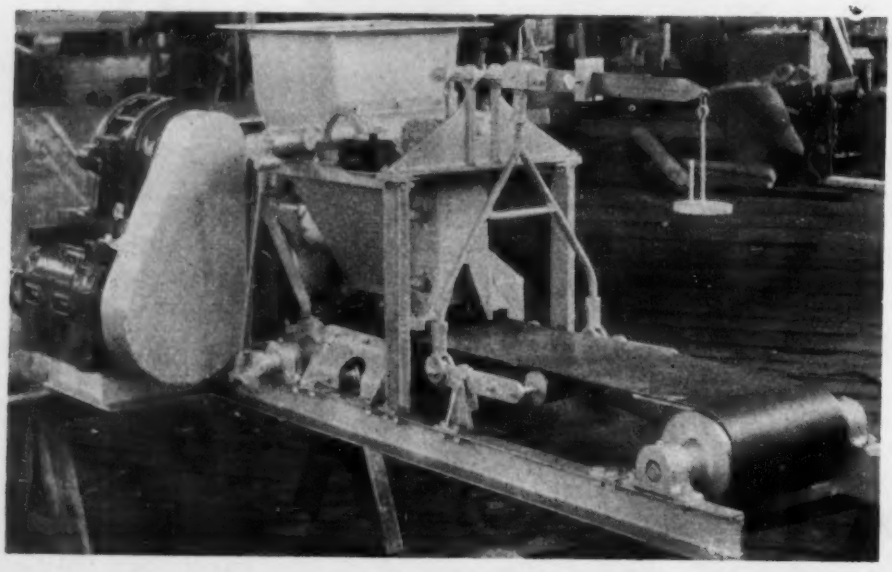
Reduces Production Costs of Continuous Weighing Machines

SUBSTANTIAL savings in cost, time and weight were reported recently by Schaeffer Poidometer Co. of Pittsburgh, in a changeover from a conventional method of manufacture to arc welding in the production of beams for use in poidometers. A poidometer, Fig. 2, is a continuous weighing machine operating on the principle of controlling the weight of material allowed to flow onto a moving belt.

Beam on which the changeover was made is a simple member loaded in the center on two vertical columns which support a pin that acts as the fulcrum on which the scale beam is balanced. Thus, load is composed entirely of a single vertical-down component.

With the industrial spurt brought about by World War II, the demand for poidometers multiplied beyond normal production capacity. To complicate the situation even further, delivery on parts made by the former method became progressively slower, bogging down all production. Out of necessity, the company turned to fabrication by welding as an expedient. The first attempt at redesign, shown in the bottom view of Fig. 1, was an obvious effort to duplicate the physical dimensions of the part it was to replace. The result was a heavier piece in steel, which had several times the strength, but the cost was considered too high.

However, all in all, the substitute was generally regarded as an improvement over the original design, but out of a desire to obtain the maximum improvement, the company requested that welding engineers from Lincoln Electric Co., Cleveland, perform a functional analysis of the piece.



Their studies culminated in the welded beam shown at the top, Fig. 1, and came about through the following reasoning: If the gate which operated to control the flow of material onto the belt was stuck in the full-open position, the densest material ever handled could not impose a load greater than 100 lb on the fulcrum pin and thus on the beam. Any large deflection would, of course, affect the accuracy of the beam calibration and would be intolerable. However, since the original part had always served satisfactorily, its deflection under such a load would be the criterion for the welded design.

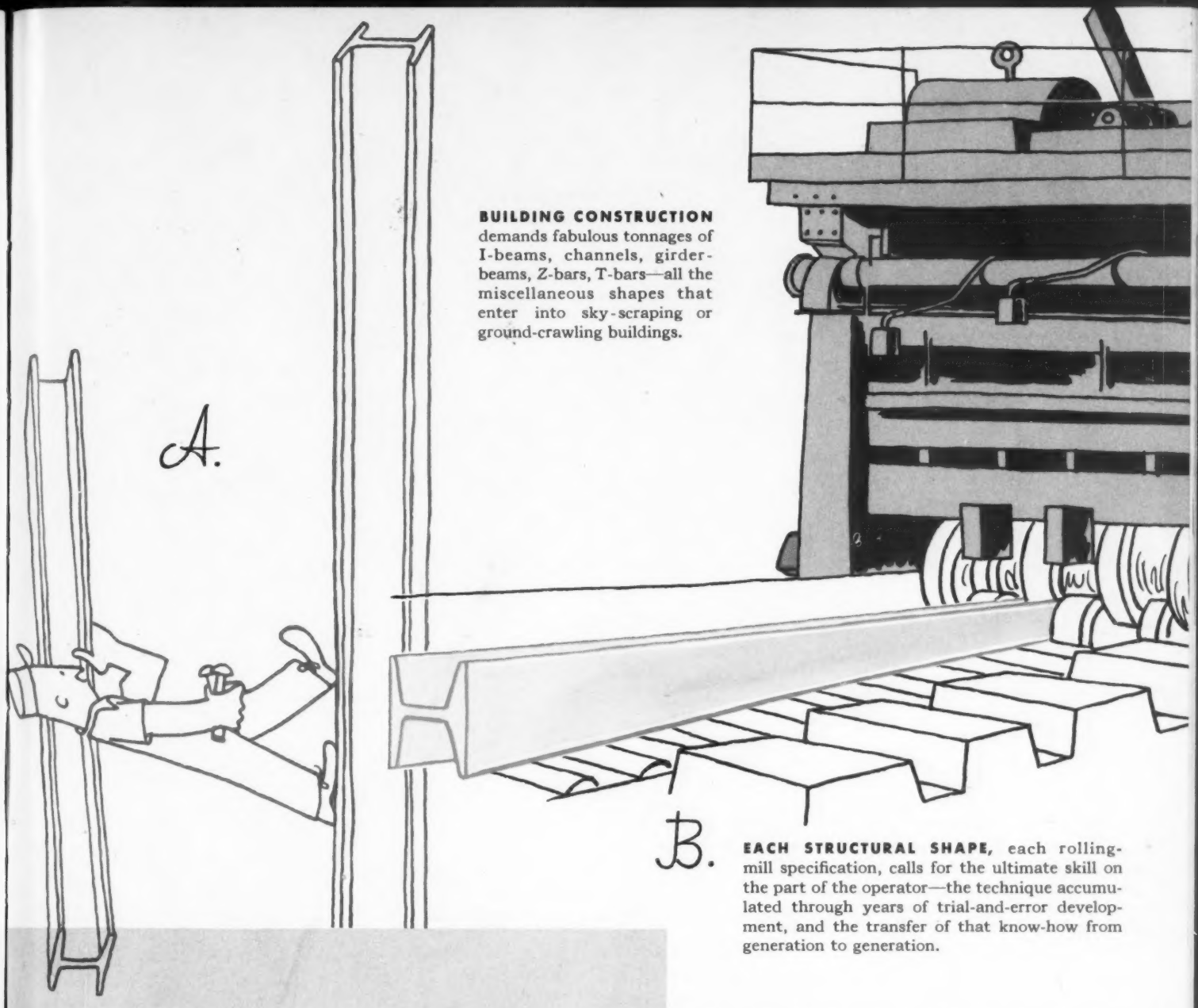
The small cross sections, 1 x 1/4-in., in the original piece, just below the pin holes, Fig. 1, are a serious weakness in the original design at this point. So delicate was the section that it was necessary to build a rather elaborate jig to support the vertical columns near the top while machining the pin holes. The welded steel construction completely eliminates this complication. Machining time is reduced because faster cutting means a smaller amount of finish material has to be removed.

The first welded replacement weighed 11 lb, contained 14-in. of 1/4-in. butt weld and 22-in. of 1/4-in. fillet weld and cost:

Material	$ .33
Cut and Fit	.35
Weld	.30
Overhead	.65

The second welded beam. which was based on the functional analysis conducted by Lincoln engineers, weighs 7 lb and contains 16-in. of 3/16-in. fillet weld and cost:

Material	$ .21
Cut and Fit	.10
Weld	.15
Overhead	.25



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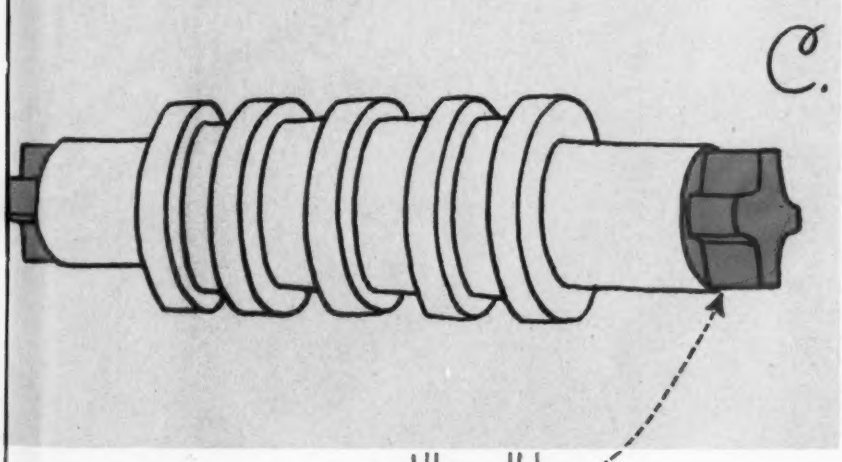

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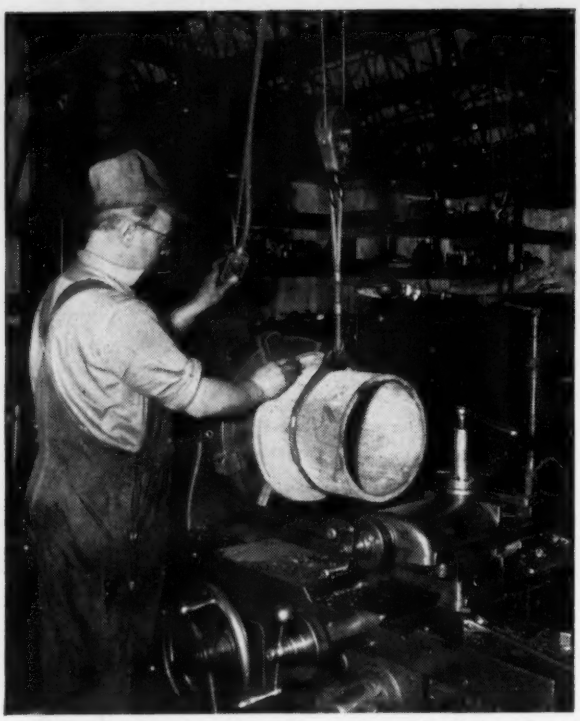

The amazingly flexible all-steel Cable-Laid ACCO Registered Wire Rope Sling adapts itself to a variety of uses. Here a machinist, using choker sling, effortlessly lifts heavy flanged collar into his lathe.

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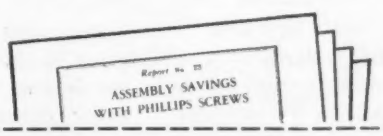

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Planned Handling—*Concluded from Page 95*

The elements which engage the sheets are adjustable so as to handle stacks of various numbers of sheets. The hoist installation has made it possible to do a job in 1 hour which previously took 8.

Processing to Processing Station—Strip steel from which elements of roller, silent, and automobile chain are punched, is pickled and then rolled to the desired thickness in the Morse Chain mill. As the strip leaves the finishing rolls it is coiled, bound, and placed on pallets. Strip is rolled in 1, 2 and 3-inch widths and in various thicknesses for various gages of chain. Small coils (about 2 feet in diameter) are stacked about 25 deep on small-sized pallets 28 x 26 x 4-inches. Larger coils (about 4 feet in diameter) are stacked about 15 deep on standard-sized pallets. After the coils have been stacked, they are weighed. Loads weighing up to 2400-pounds are then taken either to the press room or to temporary storage.

One Yale worksaver tilting-fork truck and two Yale center control tilting-fork trucks are used in the handling operations. The former is especially valuable in tight places. It is handle-guided from the floor and is propelled by an electric motor controlled from the handle. The latter type, in addition to lifting and tiering features, can save time in transporting goods to and from distant points in the plant. The tilting fork feature of both trucks nestles the load at an angle and prevents spilling when going downgrade, turning corners, or coming to sudden stops. An innovation used at this plant is the placing of channel angles over the forks to extend their length when lifting large loads.

Formerly, coils of steel were loaded onto skids by hand, but now the larger coils are tiered onto pallets by forks. Hand trucks were formerly used to transport the coils to the press batteries. The savings effected by the fork trucks in these handling and transportation operations run into thousands of dollars per year.

Space for Coiled Strip — The greatest improvement in the handling system was made in the efficient use of space for coiled strip and assembled chain. Previously, both strip and chain were handled on metal skids. As the inventory built up in temporary storage areas, the square footage was used up. This resulted in congested areas, overflow of skids into aisles and work areas, and an unco-ordinated flow of materials to and from the storage zone.

The new system, in addition to the fork trucks and pallets already mentioned, makes use of a specially-designed skid bin. The advantage of the fork truck, pallet, and skid bin system is that now pallets and skid bins can be tiered, thereby making a storage space out of what was previously a storage area. Final inspection area for assembled chain, shown in Fig. 5, is roughly 40 x 25-feet, and by tiering the special skid bins, the storage space was increased three times. The storage area for strip, shown in Fig. 2, is roughly 60 x 24 feet, by tiering the pallets by means of the fork truck, this storage space was increased three times.

Special skid bins in which the chain is stored are of welded steel construction. They consist of a skid base with an angle iron frame superstructure. Top rim of the superstructure is constructed so that the legs of succeeding tiered bins can nest securely without danger of the bins falling. Fact that bins have no sides makes it possible to tell at a glance what type of chain is in the skid bin, and also to remove chain from lower bins without removing upper bins. The overall effect of the new equipment is to make a neat appearing temporary storage; permit easy handling of chain to and from assembly, temporary storage, and shipping departments; make inventory taking easy; and require less "muscle" labor in handling the chain.

Waste Handling—Another job performed by the fork truck is the handling of waste or scrap metal. The Ithaca plant is located on a hill, and separate bins for slugs, turnings, and punched-out strip have been constructed on the side of the hill so that they empty directly into rail cars below. Scrap is collected in a large skid dump-hopper within the plant. The metal hopper is then picked up by the fork truck, carried to the refuse bins and dumped.

Packaged Chain to Shipping—Finished chain is packed in cartons on the second floor and is taken by elevator down to the first floor for weighing and shipping. Two fork trucks operate as a team in this operation. The second floor truck transports the packaged chain, stacked on pallets, and loads it onto the elevator. The elevator then descends to the first floor and the first floor truck unloads it and carries the cartons to a roller conveyor. Meanwhile the second floor truck is returning for another pallet load.

Packaged chain is placed on a roller conveyor about 2 feet wide which passes an operator who binds the cartons with strips of steel before weighing and shipping. In some cases chain is crated in the shipping room. A ½-ton electric hoist with a special grab attachment is used to lift full crates onto the conveyor.

The grab is a tong-like affair with transverse angle pick-up elements about 8 inches long. The angles engage wooden cleats which form part of the crate and when the hoist hook is raised, the tong tightens on the cleats, and the crate is lifted. This particular hoist is operated by a bar grip control which the operator controls with one hand. Each end of the bar is connected to the hoist motor by means of a rope, and when the operator pulls down on one side of the bar the hoist lifts; when he pulls down on the other side the hoist lowers.

The Kron scale, Fig. 3, which weighs the cartons before shipment by truck, has its platform built as a section of the roller conveyor. Cartons roll right onto the rollers which make up the scale platform. A girl standing directly before the dial of the scale halts the carton, gets its weight by glancing at the scale dial, marks it on the carton, and shoves the carton on to be loaded onto a freight truck.

Savings Effected — Main savings effected by the new system were those made possible by the three new electric fork trucks. These trucks have added storage space to the plant (by tiering pallets and skin bins), decreased the "muscle" labor required in handling operations (coils of steel were formerly loaded onto skids by hand, but now the larger coils are tiered onto pallets by means of fork trucks), facilitated storeroom operations (i.e., appearance, inventory taking, accessibility of bin contents, etc.), and speeded miscellaneous handling operations.

—o—

Found to have several features superior to similar machines made in Great Britain, a hot bloom machine made by a German firm, Maschinenfabrik Sack G. m. b. H., near Duesseldorf, is built without a flywheel, pushbutton control being effected with the help of motors. A high efficiency speed reducing unit with disengaging clutch permits cutting at two different speeds. These facts and the fact that the clutch is air operated are brought out by the Office of Technical Services.

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Modified Martempering—*Concluded from Page 89*

transformation to martensite is normally accompanied by growth in the part being hardened for the simple reason that this constituent occupies more volume than pearlite. In conventional oil quenching martensite is first formed around the edges, corners and impressions of the die, leaving the interior of the mass to be transformed later. The areas first to transform become rigid and restrict the tendency of the remainder to expand as it in turn is converted to martensite. Thus, longitudinal expansion is prevented or minimized. However, the probability of warpage and even cracking is always present because of the severe strains which are introduced by this type of quench.

On the other hand, salt martempering results in uniform transformation to martensite from the nuclei scattered throughout the mass. Restriction to growth being eliminated, the normal expansion incident to transformation occurs and accounts for the growth difficulty we experienced.

Introduction of martempering oil made possible a quench or an equalization temperature intermediate between that of salt and conventional quenching. We were interested in learning what effects such modifications would have on size change and whether they would create a tendency toward warpage or cracking. To determine the possibility of its use the tests described later in this article were carried out. These tests show the effects of various quenching methods on size only. Hardness being satisfactory with all methods, it was considered justifiable to limit the test to the one problem and so no consideration was given to other factors as microstructure, impact or wear resistance. However, our experience has since demonstrated that these factors are very satisfactory.

A number of test blocks machined from 1 x 4 inch stock to ¾ x 3 x 4 inches were made according to the accompanying sketches, Fig. 1. All specimens were from a single bar taken from our stock pile to insure a uniform basis for comparison. One-quarter inch dowel pin holes were drilled and reamed at each corner. Half of the blocks had a 2-inch hole in the center in order to determine the effect of mass on the final results. The decarburized surface was entirely removed and after preparation the blocks were carefully measured at points indicated on the sketches. Heat treatments were identical except for quench. Preliminary stress relief was purposely omitted.

Measurements were taken with a micrometer over pins driven in the dowel holes, parallel to the direction of rolling; perpendicular to the direction of rolling; and along the diagonal. In the case of bored specimens measurements were also taken directly over the holes across the entire specimen.

Heat treatments applied were as shown below. Detailed treatment is shown in the accompanying table.

1. Heat to 1475° F—martemper at 400° F—draw to 400° F
2. Heat to 1475° F—oil quench (85° F)—draw to 400° F
3. Heat to 1475° F—martemper in hot oil—draw to 400° F

Result of Test: Hardness was satisfactory in every case, being 60 RC after a 400° F draw. Every specimen showed expansion in greater or lesser degree upon quenching. In all but one case, the draw operation had the effect of reducing the growth somewhat. In the one exception (specimen No. 4)—a bored block, martempered—four dimensions remained stable, three were reduced, and five showed further growth in the draw operation. Apparently this was due to the restriction to change caused by the arch effect of the bored hole. The mate to this specimen (specimen No. 1)—a solid block, similarly martempered—showed a contrary effect upon drawing in that growth in this case was reduced.

Treatment No. 1 — conventional martempering and draw to 400° F

A. Solid block: Average growth per inch of section—.00102 inch

B. Bored block: Average growth per inch of section—.001156 inch (Draw operation aggravated growth)

Treatment No. 2—conventional oil quenching and draw to 400° F

A. Solid block: Average growth per inch of section—.000907 inch

B. Bored block: Average growth per inch of section—.000152 inch

Note that the average growth was almost negligible in the latter case. However, this is due to the fact that some dimensions contracted. In addition to this, severe distortion occurred in that the surface of the part became concave. The readings were taken as an average but in reality the variation was great, due to the fact that the sides were no longer parallel. Dowel pin holes shrank badly.

Treatment No. 3 — martemper in hot oil—draw to 400° F

A. Solid block (oil temperature 280° F): Average growth per inch of section—.000547 inch

B. Bored block (oil temperature 250° F): Average growth per inch of section—.000142 inch

Average growth per inch was determined by adding all measurements on a given piece and dividing the total of all increases by the number of measurements.

These tests proved the advantage of modified martempering and lead to further tests on a number of dies intended for regular production. Fig. 3 shows work produced by some of the modified martempered dies. In each case the die was finished first, then the punch was mounted, sheared in, and clearance filed. Not one of the punches or dies required reworking after hardening. Pierced punches were mounted on precision bored punch holders, but not a single punch had to be pierced to adjust alignment. Shear break in every blank was uniform, indicating perfect clearance between the punch and die around the entire periphery.

It has been impossible to establish a fixed quench bath temperature for all work. Very slender punches require a higher temperature, but the usual run of dies are equalized at 250 to 280° F. By this treatment, a considerable amount of martensite is formed in the quench, leaving the remainder to transform during air cooling to room temperature.

IDENTIFICATION OF SPECIMENS

Specimen 1—Solid Block
Quenched in salt at 400° F—Time 5 minutes
Rockwell C65 before draw
Rockwell C60 after draw

Specimen 2—Solid Block
Quenched in martemp oil at 280° F—Time 5 minutes
Rockwell C65 before draw
Rockwell C60 after draw

Specimen 3—Solid Block
After removal from furnace this block quench was delayed 25 seconds. Block was quenched in oil 1 minute at 85° F and finish cooled in air.
Rockwell C65 before draw
Rockwell C59.5 after draw

Specimen 4—Bored Block
Quenched in salt at 400° F
Rockwell C62 before draw
Rockwell C60 after draw

Specimen 5—Bored Block—Quenched as specimen 3.
Rockwell C65 before draw
Rockwell C60 after draw
This block expanded on some dimensions and shrunk on others, and the entire part was dished. Dowel holes became oval. Overall average growth as indicated on table should be considered with these facts in mind.

Specimen 6—Bored Block
Quenched in martemp oil at 345° F—Time 5 minutes
Rockwell C60 before draw
Rockwell C59 after draw

Specimen 7—Bored Block
Quenched in martemp oil at 250° F—Time 5 minutes
Rockwell C65 before draw
Rockwell C60 after draw

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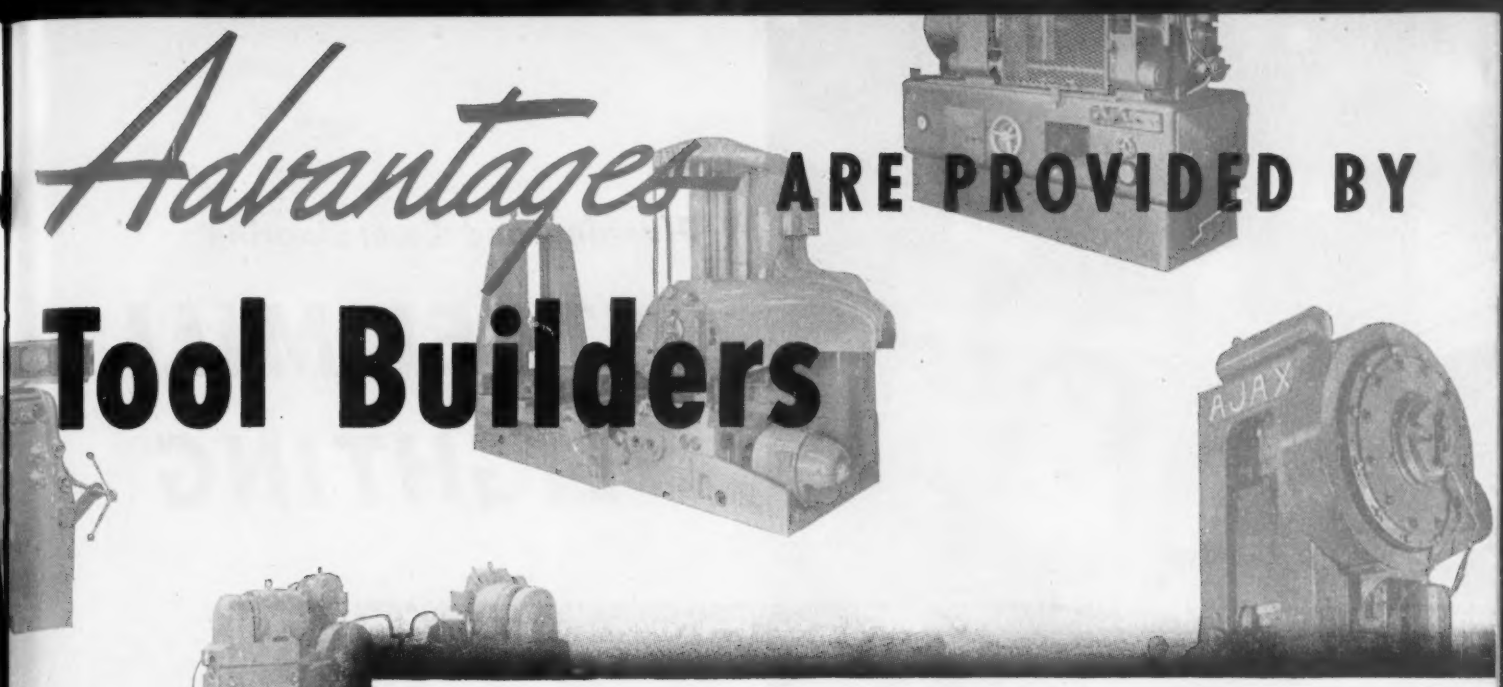

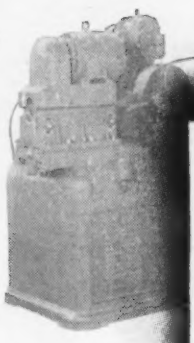

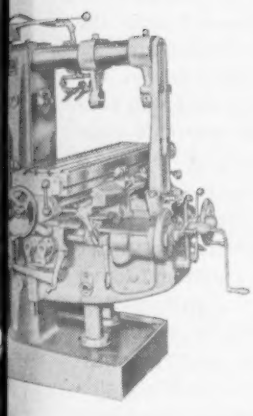

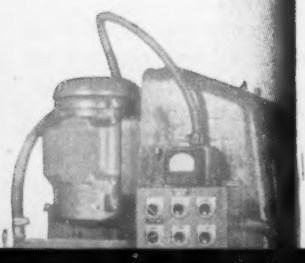

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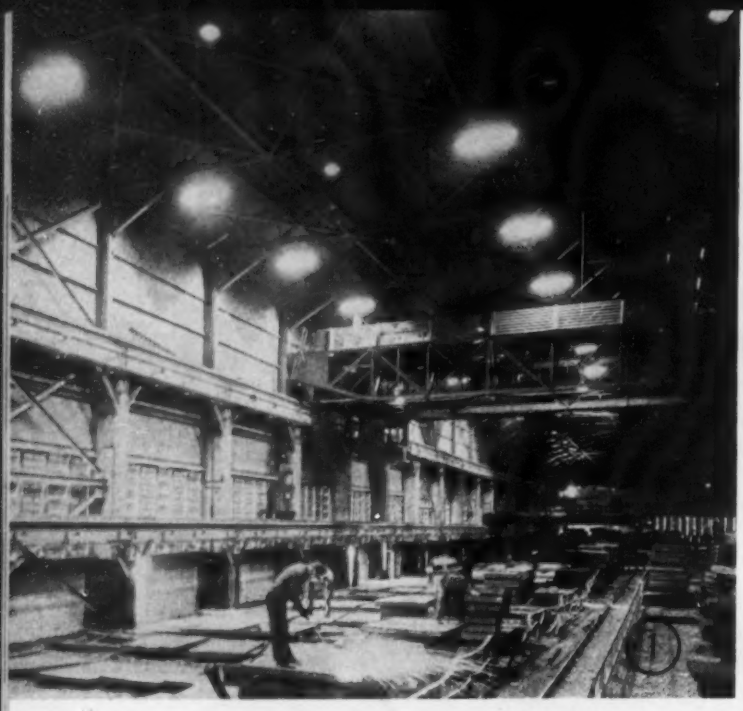


Planning and Co-ordinating

STEEL MILL LIGHTING

By W. H. KAHLER
Lighting Engineer
Westinghouse Electric Corp.
Cleveland

Well-planned system of modern illumination contributes to a reduction in the amount of spoilage, stepping-up of production and an improvement in labor relations. Author discusses various types of lighting equipment and planning procedure for installation

LIGHTING systems must serve two fundamental purposes—light for production and light for safety. Thus, an adequate quantity of illumination of proper quality should be provided to meet the seeing requirements of production and safety within practical economic limits.

Lighting should be apportioned according to the visual requirements in the different areas of the mill. Many steel plant areas involve only rough manual tasks where the seeing of fine detail is not a consideration. For spaces such as stockyard, storage, and coal handling, illumination of about 5 footcandles is sufficient for safe working conditions. Where work is visually controlled, but more or less casual and not involving fine details, 10 to 20 footcandles is adequate. In certain localized areas involving close visual discrimination the general illumination must be supplemented by special lighting for the specific critical tasks. The supplemental lighting should be carefully directed and controlled to produce the desired quantity and quality. A high level of general illumination is essential in other spaces where the discrimination of fine detail may be necessary at many locations in the area. Chipping, scarfing, and slab conditioning areas all fall into this classification.

Light for Safety: Lighting serves a vital function in providing safe working conditions throughout the entire steel mill both indoors and outdoors. Safety lighting mean lighting that makes all hazards clearly visible at all times. There is no specfiic minimum footcandle level for safety lighting as many other factors enter into visibility of hazards besides the lighting. However, the following checkpoints may aid in planning lighting for safety.

1. Locate lighting units so that hazards are not shrouded by heavy shadows.
2. If possible, create a condition of contrast so that hazards stand out.
3. Illuminate all aisles, passage-

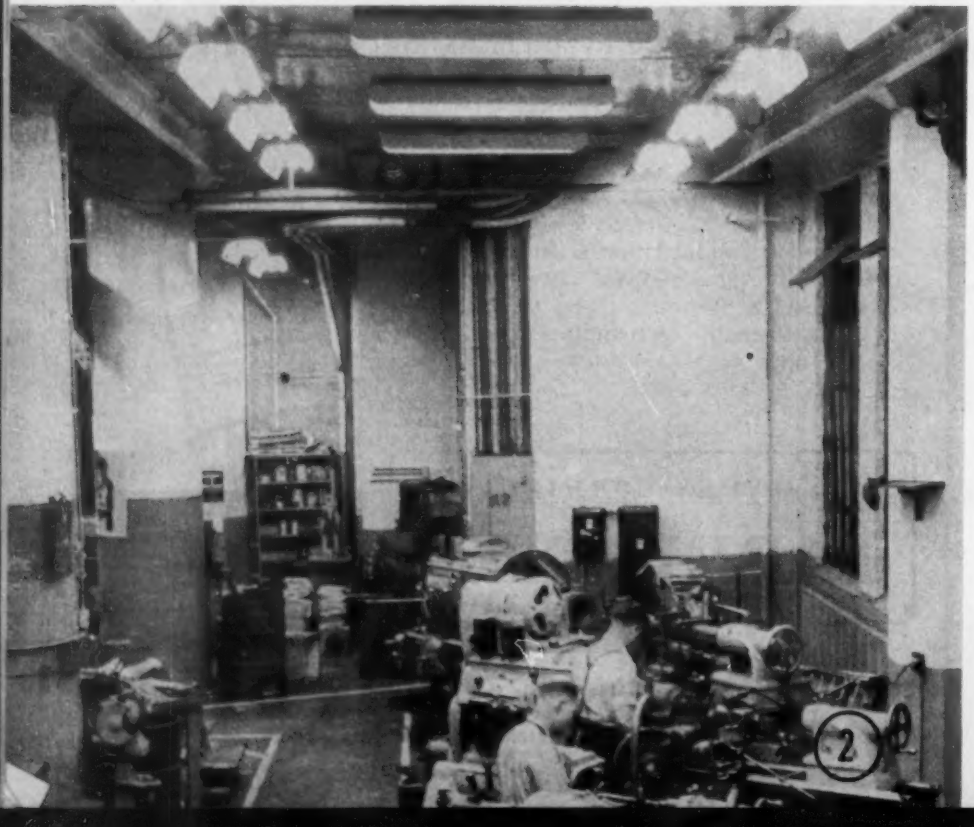
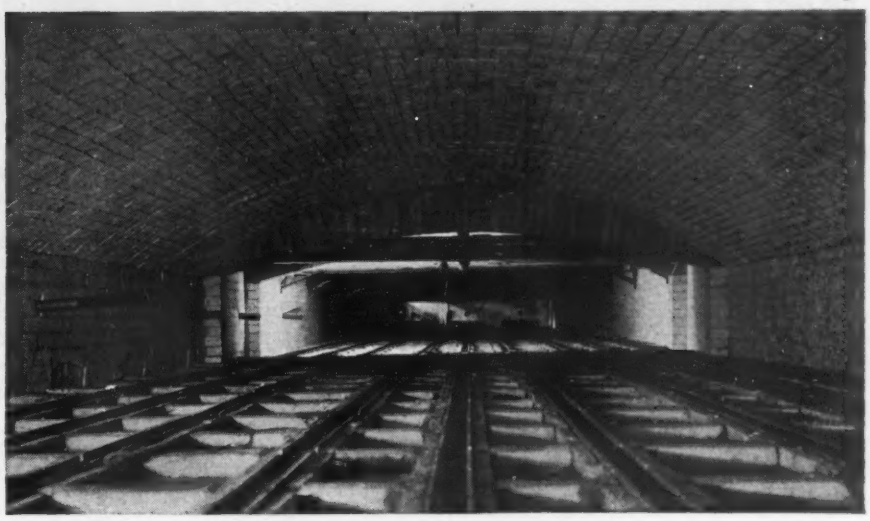


Fig. 1—In this slab-conditioning building 3-kilowatt mercury luminaires and 1000-watt incandescent high-bay units provide 50 footcandles. Note 1000-watt luminaire between 3-kilowatt units

Fig. 2—Fluorescent lighting in this machine shop consists of 2-lamp 100-watt luminaires arranged in a grid pattern

Photos courtesy Surface Combustion Corp.



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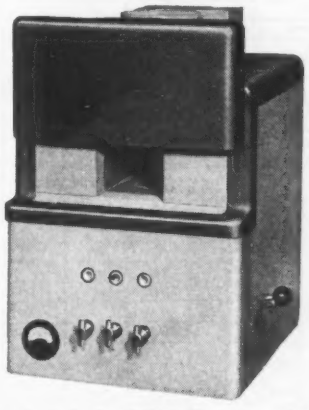

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ways, walks and other thoroughfares both inside and outside of the building.

4. Stairways should have one light for each landing. At least two lamps should be provided for any one stairway so that a lamp outage will not leave the stairway in total darkness.

5. Provide special watchman's lighting circuits throughout the buildings to enable the watchman to complete his rounds safely.

6. Install exit lights, illuminated direction signs, or special warning lights as appear necessary or are required by local statute.

Planning Procedure: The best lighting for a particular mill can only be obtained by careful planning of the entire installation. The plan can be developed to produce the most satisfactory results by following four general steps of design procedure in the order outlined below:

1. Analyze the layout of the mill from the standpoint of visual operations and requirements for lighting.

2. Determine the required quantity and quality of illumination to meet these requirements.

3. Select the most economical light source and the proper luminaire to provide the desired quantity and quality of illumination for each operation.

4. Plan for easy accessibility to luminaires for maintenance.

A chart in Fig. 3 has been prepared to assist the designer of the lighting system in selecting the proper quality and quantity of illumination as well as practical luminaires for each important area in the mill. Recommendations in the guide should be used in combination with sound engineering judgment to solve specific problems in each mill area. Illumination levels, luminaires, and light sources suggested in this guide have been chosen on the basis of their adaptability and acceptability for modern steel mill lighting.

Incandescent, mercury, and fluorescent luminaires each have definite applications in steel mills. Each source has characteristics and advantages that often make it particularly suitable for a certain application as indicated by the guide.

Incandescent and Mercury Lighting: For the majority of the high-bay areas, where illumination levels of 5 to 20 footcandles are required, 500, 750, or 1000-watt incandescent and 400-watt mercury lamps have been found particularly suitable.

Where only direct-current or 25-cycle alternating current is available, the incandescent lamp is the best source to use since mercury and fluorescent lamps cannot be adapted economically to these power supplies.

Where 60-cycle alternating current is available, the mercury lamp should be given serious consideration. In most cases, mercury lighting is more economical than any other source because of its high efficiency and long lamp life. If there is objection of the yellow-green color of mercury lighting, a combination of incandescent and mercury produces an acceptable color quality. Equal lumens from mercury and incandescent lamps is an ideal mixture, but 75 per cent mercury and 25 per cent incandescent is sufficient for fair color correction and the economy of the mercury is retained. If the power supply is subject to momentary voltage dips of more than 15 per cent, some mercury lamps may go out, but the incandescent lamps will furnish enough illumination until the mercury lamps relight and regain their full intensity.

3-KW Mercury Lamp: In areas where higher illumination levels are required, such as for chipping, slab conditioning and inspection, the 3-kw mercury lamp has been found to be ideally adapted because one lamp produces such a great quantity of light. This lamp has an output equivalent to eight 750-watt incandescent lamps or 7-1/2, 400-watt, H-1 mercury lamps. Thus relatively few 3-kw

Guide to Lighting Steel Mill Areas

STEEL MILL AREAS	RECOMMENDED FOOTCANDLES (IN SERVICE)	LUMINAIRES A	B	C	D	E	F	G	H	I	J
		LAMP TYPES & SIZES (WATTS)									
		500 to 1000 MV, 400 MH	200 to 300 INC	3000 W MERC	2 to 3-40 W 2-100 W FLUOR	200 to 300 INC	2 to 4-40 W FLUOR	300 to 1000 INC	200 to 1500 INC	200 to 500 INC	3-40 W OR 2-110 W FLUOR
		PRACTICAL UTILIZATION VOLTAGES									
		115 - INC 208 to 240 MH	120	230 or 440	120 or 240	120	120 or 240	120	120	120	120
OPEN HEARTH BUILDINGS											
1. CHARGING FLOOR	10	✓									
2. HOT METAL AREA	10	✓									
3. MOLD PREPARATION	10	✓									
4. POURING BUILDING	10	✓									
5. SCRAPING BUILDING	5	✓									
6. STRIPPER BUILDING	5	✓									
7. STORAGE	5	✓							✓		
8. STOCK YARD	2	✓									
BESSEMER CONVERTER BLDGS											
9. CONVERTER AREA	10	✓									
10. MIXER BUILDING	10	✓									
11. POURING BUILDING	10	✓									
12. BOTTOM HOUSE	10	✓							✓		
13. SCRAP YARD	2	✓									
ROLLING MILLS											
14. BILLET, BLOOMING, SLABBING MILLS	10	✓									
15. PLATE, BAR, STRUCTURAL MILLS	10	✓									
16. HOT SHEET & STRIP MILLS	10	✓									
17. COLD STRIP, PIPE, RAIL, ROD, TUBE	10	✓			* ✓	* ✓					
18. WIRE DRAWING	10	✓									
19. CHIPPING, SCRAPING, GRINDING, SLAB CONDITIONING	30	✓		✓							
TIN PLATE MILLS											
20. HOT STRIP ROLLING & TINNING	10	✓				✓					
21. COLD STRIP ROLLING	20	✓			* ✓	* ✓					
22. INSPECTION	50	✓			* ✓						* ✓
AUXILIARY AREAS											
23. MOTOR ROOM	20	✓									
24. ROLL SHOP	30	✓			* ✓						
25. CHISEL GRINDING	30				✓						
26. BLACKSMITH SHOP	10	✓									
27. CONTROL PULPITS	20				✓						
28. LABORATORIES	30				✓						
POWER PLANT											
29. BOILER ROOM, COAL & ASH HANDLING	5	✓	✓								
30. GENERATOR ROOM	20	✓									
31. CONTROL & SWITCH BOARD ROOM	30				✓						
MACHINE & MAINTENANCE SHOPS											
32. GENERAL REPAIR & MAINTENANCE	30				✓						
33. GENERAL MACHINE SHOP WORK	30				✓						
34. TOOL MAKING & REPAIR	50				✓						
WELDING											
35. GENERAL LIGHTING	20	✓	✓		✓						
AT THE WORK POINT	1000	SPECIAL EQUIPMENT REQUIRED TO OBTAIN THIS ILLUMINATION WITHOUT DISCOMFORT HEAT									
OFFICES											
36. SHOP OFFICES	30				✓		✓	✓			
37. GENERAL PLANT OFFICES	30						✓	✓			
38. ACCOUNTING, BOOKKEEPING, DRAFTING	50						✓				
ROADWAYS											
39. MAIN THOROFARES	2									✓	
40. SECONDARY ROADS & WALKS	.5									✓	
UTILITY SPACES											
41. TOILETS, WASHROOMS, LOCKERS	10		✓		✓						
42. STAIRWAYS, CORRIDORS, PASSAGE WAYS	5		✓								③
43. CAFETERIA, LUNCH ROOM	10						✓	✓			
44. KITCHEN	20				✓		* FOR SUPPLEMENTARY LIGHTING				
45. DISPENSARY, FIRST AID	30						✓				

Fig. 3—Chart for selecting desired quality and quantity of steel mill illumination

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units are required to produce illumination levels in the order of 35 to 50 footcandles. The 3-kw mercury luminaire operates from a current regulating ballast which is available for one or two lamps and is designed for high power-factor operation. These ballasts can be obtained for either 230 or 460-volt alternating-current supply lines. The latter voltage is often used because of the economies that can be realized from electrical distribution with 3-phase, 460-volt power. The 3-kw mercury lamp is actually a miniature sun and particular care should be taken in using this source to prevent annoying glare. The luminaire should always be mounted at least 40 feet above the floor and should be located so that the normal viewing is across the axis of the lamp as maximum shielding is provided by the reflector in this direction.

Fluorescent Lighting: Equipment for this type of lighting is suitable for the illumination of control pulpits, offices, machine shops, maintenance department areas, and other low-bay spaces where good quality illumination is desired. Fluorescent lighting is also excellent for supplementary applications because the reduced brightness and low radiant heat contribute to greater working comfort.

During the war, fluorescent lighting was used in many high-bay areas in aircraft manufacturing plants but it is not considered practical in steel mill high-bay areas, since the bays are relatively narrow and maintenance presents a difficult problem.

The fluorescent lamp is primarily an alternating-current device for 50 or 60-cycle supply circuits. It can, however, be operated from direct current if luminaires are specifically designed for this service and if special installation precautions are observed. Efficiency on direct current is lower than for alternating-current operation.

The Guide lists ten different types of luminaires that are used extensively in steel mills. From these general types of equipment can be selected a luminaire suitable for practically any steel mill application.

(A) High-Bay Luminaire: Since most of the mill areas necessitate relatively high mounting, the high-bay type of luminaire is particularly important for steel mill lighting. It is available as an open or enclosed unit, but the enclosed, heavy-duty luminaire has found wide acceptance for its dust-tight and rugged features.

It is available for 500 to 1000-watt incandescent lamps or 400-watt mercury lamps and in wide, medium, or narrow distribution. This unit being fully enclosed and dust-tight requires a minimum amount of maintenance since the reflector and lamps are protected from the steel mill dirt.

The three distributions (wide, medium, or concentrating) give high-bay luminaires considerable flexibility in mounting height and spacing. A given distribution is not necessarily confined to a particular mounting height, but in general, wide spread units are used from 18 to 30 feet, medium spread 30 to 45 feet, and concentrating above 45 feet. In selecting the proper distribution, the relationship of the spacing to the mounting height should be checked to insure uniform distribution of light at the working plane. Spacing should not exceed 1.2 times mounting height for wide spread units, 0.8 for medium, and 0.5 for concentrating.

(B) RLM Dome Reflector: This is an open, wide spread, porcelain enameled unit constructed according to specifications of the RLM Standards Institute. It is most suitable for low mounting heights (under 18 feet) and it is used primarily today for utility areas such as locker rooms, stairways and storage rooms. One important advantage is the range of sizes available for lamps from 100 to 1500 watts.

(C) 3-KW Luminaire: This is designed exclusively for this high wattage mercury lamp. It consists of an open, porcelain-enameled reflector and a wireway channel or hood to which the lamp holders are attached. The reflector, being porcelain enameled has a relatively wide distribution which contributes to minimizing shadows. A specification for this luminaire should call for a type of equipment in which the wire channel is sufficiently cooled to permit safe operation of conductors with AVA insulation. Also the unit should be designed to permit wiring without removing the lamp holders as their spacing is critical and should be factory set.

(D) Fluorescent Luminaire: The direct type are available for two or three 40-watt, or two 100-watt lamps. This equipment can be mounted as individual units or in continuous rows. For illumination levels of over 30 footcandles the continuous rows generally provide the best layout and are more economical, while under 30 footcandles, individual units usually work out better. Direct fluorescent equipment should be installed with a spacing not in excess of the mounting height.

For shop offices or low mounting over benches, louvers should be used to properly shield the lamp and prevent annoying glare.

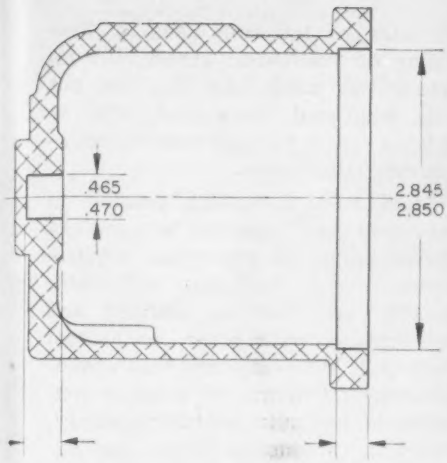
(E) Industrial Concentrator: These units made for 200, 300, or 500-watt incandescent lamps are for supplementary illumination where a high intensity is required over a relatively small area. Concentrators, being adjustable, are ideal for locations where a controlled direction of light is necsary as may be the case for certain inspection operations, large fabricating machinery, or vertical surface lighting. This type of luminaire is usually totally enclosed and vapor-tight which permits its use in damp or dirty locations.

(F) Direct-Indirect Luminaire: These fluorescent luminaires with louvers are excellent for steel mill general offices as they are open top and bottom and collect a minimum of dirt. Approximately half of the light output is directed upward and half downward. Thus, ceiling and upper parts of the room are well illuminated, an important requirement for comfortable office lighting. The direct component is of sufficient proportion to provide efficient economical illumination without excessive radiant or total heat. The louvers for direct-indirect units should shield the lamps to approximately 30 degrees below horizontal.

(G) Luminous Indirect Equipment: This equipment for incandescent lamps should be used in offices where fluorescent lighting is impractical. The quality of light from such a system is excellent, but efficiency is low. Thus, it is best to limit such installations to about 30 footcandles or 7 watts per square foot to prevent annoyance from radiant heat.

(H) Floodlights: These are available for outdoor applications in heavy or light-duty types. The former, consists of a cast aluminum housing and a hinged cover door with all electrical and reflecting parts completely protected from the weather and abuse. Light-duty floodlights are totally enclosed, but the reflector also serves as the outer housing and all component parts are of lighter construction than the heavy-duty equipment. Thus heavy-duty floodlights are preferable for most steel mill areas.

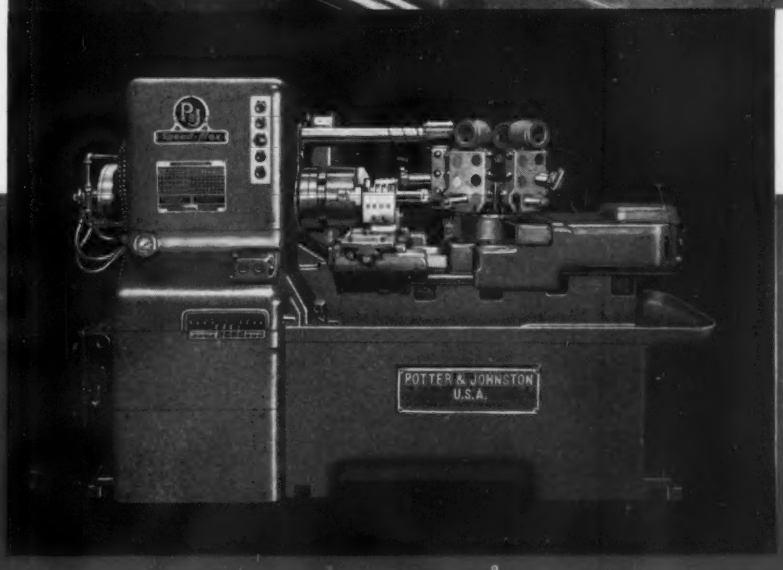
(I) Street Lighting Equipment: Equipment of the enclosed type is recommended for roadways, outdoor walks, and main entrance ways. Good practice requires that light emitted from the luminaire be directed mainly toward the road or other area to be lighted to insure maximum utilization of light. A variety of distributions and wattages are available to meet the requirements of narrow or



THE PART . . . *Die cast aluminum governor body.*

THE METHOD . . . . *closed end to spindle, grip on body with two fixed and one swivel jaw.*

THE MACHINE . . . .



3-U SPEED-FLEX

AUTOMATIC TURRET LATHE. This is another in our series showing production data on machining ferrous and nonferrous castings and forgings up to 6" dia. on the new P.&J. 3-U SPEED-FLEX. In this instance the part is a die-cast aluminum governor body. Because the casting is variable in form, and because concentricity between the small blind hole and the large counterbore is essential, the design of the chuck jaws is vitally important. Thus the arrangement of one swivel and two chuck jaws to hold the part insures (a) that the casting is accurately located, and (b) permits quick chucking action. For this particular subject the spindle speed is set at 1445 R.P.M. for all operations, and the feed per revolution is fixed at 0.006 inch. Cutting speeds, however, vary with the different diameters being turned. The final result is a production of 67 pieces every hour! As a matter of fact, the full possibilities of the 3-U SPEED-FLEX have yet to be determined. It combines flexibility with speed of operations to permit fast, automatic machining of many types of small parts that formerly were finished in several machines. Perhaps you would like to check some production data yourself. Send us a blueprint, or the part itself, and we will send you production figures that will give you a better insight into the possibilities of POTTER & JOHNSTON'S NEW 3-U SPEED-FLEX AUTOMATIC TURRET LATHE.

Potter & Johnston Machine Co., Pawtucket, R. I.

wide roads or general area lighting. Wherever practical, luminaires may be mounted on the buildings, but in certain cases it is necessary to use pole mountings.

(J) Low-Brightness Light Hood: This is used as a supplementary luminaire for inspection of specular sheet where low-brightness reflectors are an aid in detecting scratches, dents or other imperfections. It may also be advantageous for layout work on specular metal surfaces in fabrication work or toolmaking.

High Bay Lighting Control: In areas where luminaires are mounted 30 to 60 feet above the floor, long branch-circuit runs are necessary if the panelboards are located on the columns at floor level. These long runs can be eliminated by using truss-mounted contactors to control the lighting. With feeders and contactors located in the trusses it is only necessary to extend small conductors to the floor for remote control of the entire lighting system. Many large installations are controlled today by contactors and are proving to be very satisfactory.

Maintenance should be planned with the lighting system, as luminaires must be readily accessible if they are to be serviced properly. For equipment mounted up to 18 feet above the floor, access from ladders or telescoping lifts is practical. For heights above 18 or 20 feet, access should be from a traveling crane or catwalk, or luminaires should be mounted on lowering hangers. Providing for convenient access may increase the initial cost slightly, but this additional investment will be quickly repaid through reduced maintenance labor costs.

Thus, modern lighting practice in the steel mill calls for a complete system in which the seeing requirements, overall economy, and maintenance are carefully planned and co-ordinated with other mechanical factors. It has been found that a well-planned system will be a major contributing factor in reducing spoilage, increasing production output, and improving labor relations. Workmen like a well-lighted, clean working space. The end result is beneficial to both management and labor.

Precision Tumbling—*Concluded from Page 94*

parts, after the wash operation, with a special oil preparation. This oil is water repellant, giving complete short term protection on parts for any type of storage.

Oil protects parts from rust and corrosion simply by forming a protective solvent film of less than 0.0002-inch thickness, thus permitting parts to be machined or inspected after they have been slushed. It gives a short term protective coating on ferrous or nonferrous metals suitable for shipping, shelf storing, water-displacing and fingerprint neutralizing; also for machined or processed parts, Parkerized or black oxidized surfaces. Room temperature for the slushing bath is recommended. Oily parts should be washed before tumbling as they tend to retard the abrasive action and also produce unfavorable working conditions.

For separating the work from the abrasive, screens are generally used. Select a mesh which will permit the abrasive to pass freely and will retain the work on the screen, or vice versa. Magnets or magnetic separators may also be used. Parts must be thoroughly washed after the tumbling operation to clean them of foreign matter. Several drying methods are in use. A very satisfactory method is to place the work (travelers, boxes, pans, etc.) under batteries of infrared lamps.

The following examples of actual tumbling jobs will serve to give the reader an idea of the scope of this method of deburring and finishing various metal products: Outstanding results, including a bright finish, have been obtained on hardware, stampings and machined parts of bronze, brass and other nonferrous metals.

Suggested Procedure

Barrel: Fixed horizontal octagon type is recommended.
Abrasive: Tumbling abrasive, tumbled; grit size selected according to the parts being processed.
Water: To reach to approximately 2 inches above the level of the mass.
Cleaner: For bright finish results on brass or bronze, use a special compound mixed with water in the ratio recommended by the supplier.
Time Cycle: To be determined by the user according to requirements (will range from 1 to 6 hours).
Wash: Wash parts before and after each tumbling operation.
Dry: Use infrared lamps.
Important: The barrels and abrasives must be washed thoroughly clean before processing any work.

Conventional methods of deburring and finishing gears involve numerous bench hand operations and as a result, may be said to be relatively slow and costly. Furthermore, it is difficult to produce uniform radii and surface finish by any hand grinding and polishing procedures.

Today, by precision tumbling, these same gears can be deburred in a fraction of the time formerly required by hand methods and with a corresponding reduction in cost. In one plant, burrs and heat treat scale are removed, perfect uniform radii are produced to blueprint specifications and a uniform high-grade finish is produced on each gear in the entire lot. In addition, it has been found that the action of the tumbling abrasive imparts a somewhat hard wear-resistant surface to the gears.

It should be pointed out that the abrasive tumbling of gears does not damage the tooth form. This has been definitely determined by careful inspection of the involute. Although the normal tumbling cycle would not exceed 6 hours, a gear tumbled for as long as 16 hours showed no change in involute.

Tumbling also tends to correct the gear run-out, otherwise known in shop parlance as the "red line."

Suggested Procedure

Barrel: Fixed horizontal octagon type is recommended.
Abrasive: Tumbling abrasive of untumbled form is preferable as it is of a more slivery type even after being tumbled-processed by the user. It is desirable to add untumbled abrasive to user's tumbled-processed grain when additional abrasive is required for ratio or loading level. A mixture of two sizes is also recommended for gears of small pitch, the larger acting as a carrier and pushing the smaller grit sizes to the roots of the gears.
The grit sizes should be selected according to the size of gears being processed and the pitch of the gears.
Water: To reach the level of the mass.
Cleaner: Use a cleaner of a type suitable for the metal being processed.
Time Cycle: To be determined by the user according to specifications.
Wash: Clean barrels, parts, abrasive before and after each operation.
Dry: Infrared lamps are recommended.
Oil: Oil dip all tumbled gears as a rust preventative.

—o—

Four magnetic materials are being made in Japan which are not made in the United States, according to a report on sale by Office of Technical Services, U. S. Department of Commerce, Washington 25, and prepared by the U. S. Naval Technical Mission to Japan. The four materials are: An iron-aluminum alloy called Alfer; Sendust, a high permeability alloy of iron, silicon and aluminum; and two permanent magnetic materials, NKS and OP, developed before the war.

MILESTONES IN AMERICAN INDUSTRIAL DEVELOPMENT

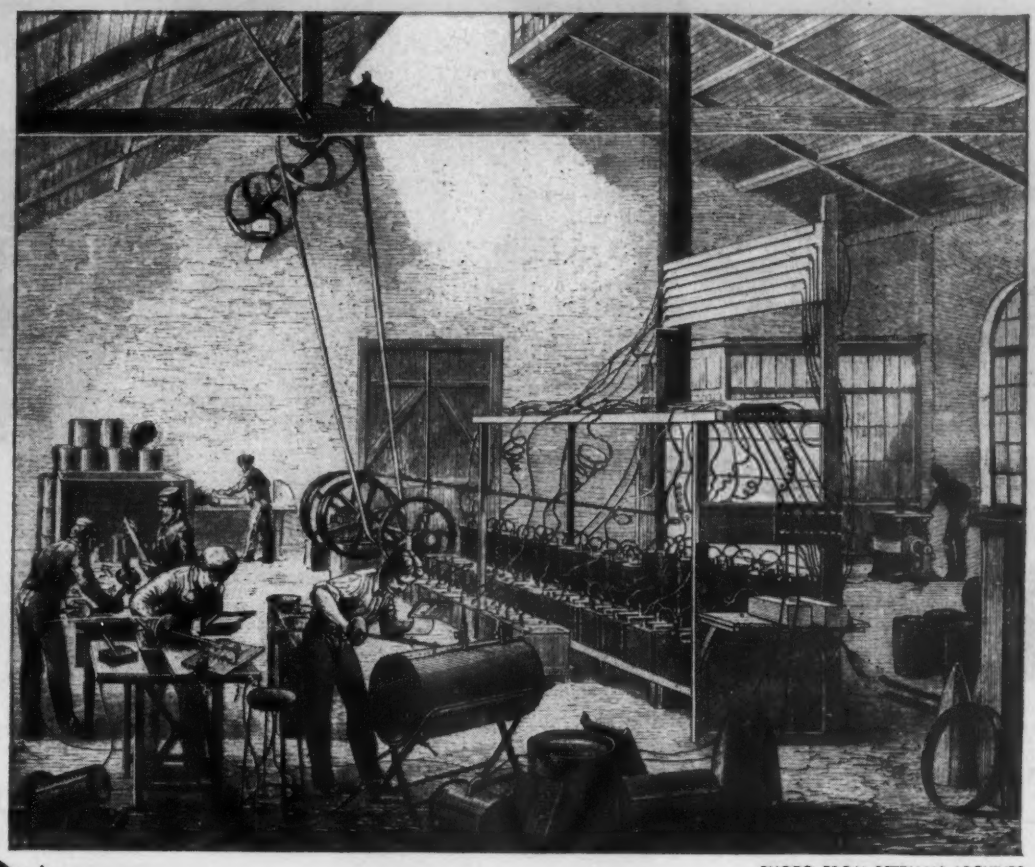


PHOTO FROM BETTMAN ARCHIVES

When Arc Welding was a Beginner . . . "STANDARD" products were Veterans in Industrial Service

Electric arc welding was already a brisk business in 1888, as the illustration shows. Invented by Thompson in 1877, it attracted immediate attention and enjoyed steady growth.

The year that saw the introduction of arc welding saw an important change in Standard service. The crucible plant was shut down, and arrangements made to purchase open hearth steel from one of the leading early manufacturers of this material. The ingots purchased were rolled into tires . . . still an important Standard product.

Standard soon found that in order to obtain the highest quality of product it was essential to control the methods used in making and casting the steel, and the company's first open hearth furnace was later installed. It was served by an electric charging machine, the first ever used with the exception of an experimental model.

Standard's present furnace capacity is approximately 160,000 net tons annually, and complete facilities permit conversion of the ingots into tires or rings up to 12 feet outside diameter, wheels up to 42 inches diameter, and forgings up to 25 tons in weight. A modern, continuous type of heat treating unit, accurately controlled by modern equipment, puts the steel into proper condition to meet the demands of service.

For an easy, convenient means of filling your forging and casting needs, just "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia, New York, Boston, Birmingham, Houston, St. Louis, Chicago, Cleveland, San Francisco, Seattle, Washington, Pittsburgh,

STANDARD STEEL WORKS DIVISION

BLW THE BALDWIN GROUP **BALDWIN**

FORGINGS AND CASTINGS

"That girl stop this epidemic? Ridiculous!"

But 300 Workers—and their families—were grateful when the Employers Mutuals nurse did just that!

A baffling epidemic of skin infection affected hundreds of workers in a midwestern factory. Production was crippled as the malady raged on, defying all efforts to discover its cause or check its progress.

Finally, an Employers Mutuals nurse was called. Despite whisperings of doubt, she watched the workers with an eye skilled to detect unhygienic practices which might furnish the cause, and found it—contamination of cutting oil. Once discovered, the cause was removed, the plague vanished, comfort of workers was restored, production returned to normal.

* * *

Such health-protecting service to workers and their families in the plants of Employers Mutuals' policyholders has been an outstanding feature for twenty years. Employers Mutuals nurses are confidants and advisers of thousands of individual plant nurses . . . first aid instructors to other thousands of plant workers. Safer plants, better health practices and improved employee relations result.

Unusual service? Employers Mutuals is geared for the unusual. Nurses, engineers, salesmen or claim adjusters . . . all are picked for their inherent capabilities, all are company-trained, all are experienced in handling policyholders' insurance affairs as policyholders think they should be handled.

Employers Mutuals write: Workmen's Compensation—Public Liability—Automobile—Group Health and Accident—Burglary—Plate Glass—Fidelity Bonds—and Other Casualty Insurance. Fire—Extended Coverage—Inland Marine—and allied lines. All policies are nonassessable.

Group insurance for your employees can be handled in the same human, friendly fashion which has characterized all other forms of Employers Mutuals' insurance. Our new booklet, "Your Industrial Relations Program," will give you a better understanding of this important service. Also, Employers Mutuals' "Dictionary of Insurance Terms" is a gold mine of information on the meanings of complex insurance terms for the busy man. Send for both on your letterhead today—or call your local Employers Mutuals man.

Employers Mutuals Policies Protect Lives, Health and Property

EMPLOYERS MUTUALS OF WAUSAU . . . make insurance understandable

EMPLOYERS MUTUALS OF WAUSAU

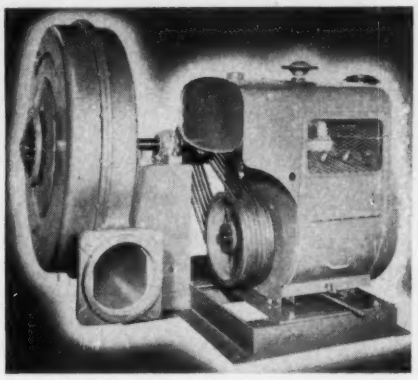
EMPLOYERS MUTUAL LIABILITY INSURANCE COMPANY OF WISCONSIN
EMPLOYERS MUTUAL FIRE INSURANCE COMPANY
HOME OFFICE: WAUSAU, WISCONSIN
Offices in Principal Cities—Consult Your Telephone Directory

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 142

1. Turbo Blower

An internal combustion engine powered unit is a recent addition the line of turbo blowers made by North American Mfg. Co., 4455 East 71st St., Cleveland 5, O. Designed for emergencies caused by power failures, the unit has an air-cooled engine, V-belt drives and impeller



jackshaft, all of which are accessible for greasing, cleaning or adjusting.

For combustion systems using oil burners an oil pump may be had with the unit. Its welded steel base is designed to permit belt tension adjustments without danger of misalignment. A governor on the engine assures a steady speed for the turbo blower and oil pump.

2. Welding Timer

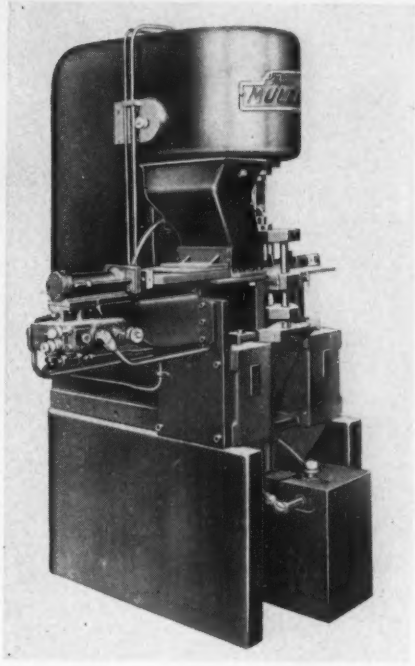
Precision control to flow of current in welding is given by the 52D Timatron electronic welding timer, manufactured by Ripley Co. Inc., Middletown, Conn. Once set for a particular thickness of metal, timing becomes automatic throughout the entire production run. Easily installed, the timer has the capacity to handle any machine up to 10 kilovolt amperes and is adjustable from 0.1 to 5 seconds by a hand control.

Control dial is calibrated so that adjustment may be made rapidly when switching from one metal thickness to another, as well as adjusting the timing period. Timer measures 4¾ x 5⅛ x 9 inches.

3. Pelleting Press

An automatic press for the pelleting of powdered or granular metals and other materials, developed by Denison Engineering Co., 1160 Dublin Rd., Columbus 16, O., has independent control of charging, compacting and ejecting ram actions. It is easily tooled for rapid die changes, easy cleaning and quick die fill adjustment. Single or multiple cavity dies or solid or cored parts may be used and made.

All ram actions are interlocked regardless of individual regulations. Repeat strokes of ram during compaction results in better expulsion



of air from the die for greater control of density and better finish. Vibratory action for charging box assures a more even die fill. Called the Multipress, the unit may be altered to suit varied compaction and flow characteristics.

4. Electric Tester

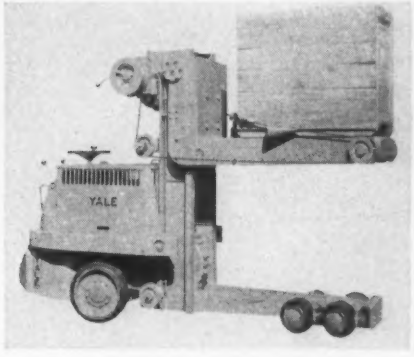
Consisting of an insulated sprocket around which are wound 6 feet of test wire, a pocket sized electric tester, made by Star Fuse Co., 235 Canal St., New York 13, N. Y., is capable of testing power circuits of from 110 to 600 volts. Cord has a standard base plug at one end and two test prods at the other, with a test lamp in one, protected by a filtered circuit to eliminate all false indications caused by nearby live wires. A high resistance in the other prod is to avoid accidental grounds.

Testing is by inserting the rubber plug into the self-contained socket on the frame of the device. The test prods are then used in the conventional manner for location of blown fuses or detection of grounded appliances. Weighing but 4 ounces, the tester may be carried in the vest pocket.

5. Platform Truck

Cables and sheaves on the new model electric high light platform truck, introduced by Yale & Towne Mfg. Co., 405 Lexington Ave., New York 17, N. Y., make possible mechanical loading of heavy pieces to or from street trucks with tailgates of varying heights and handling of dies and other large heavy objects. Cable and sheave arrangement shown in photograph is on both sides of truck.

Cable hooks engage a bar (or one another) across one end of the piece



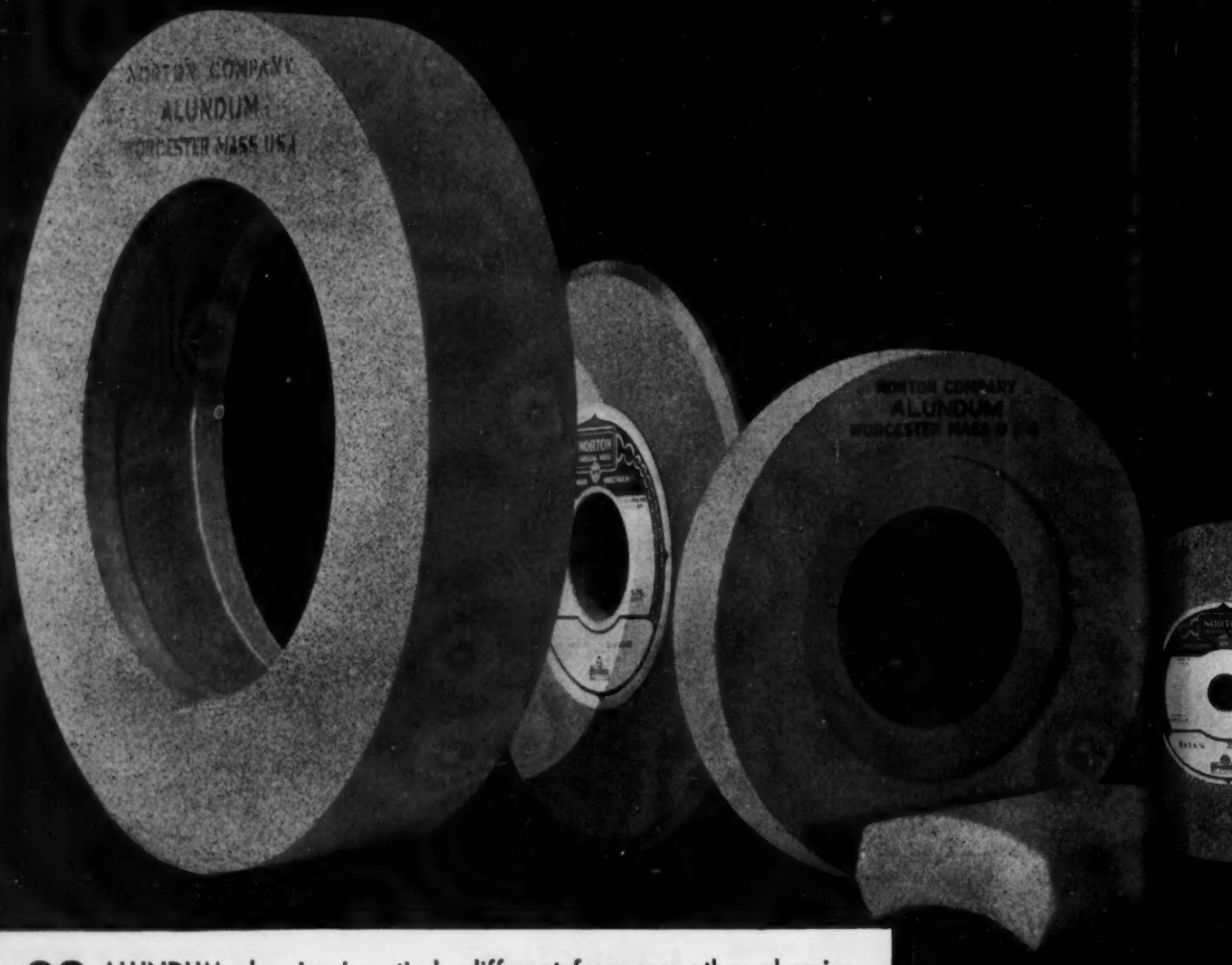
and an electric winch winds both cables simultaneously to move the load horizontally. The pulley at the bottom of the frame, along with another not visible on the other side of the truck, is used when the truck platform is down. Illustrated truck is of 6000 pound capacity.

6. Instrument Air Dryer

Instrument air dryers with a capacity of 12½ to 250 scfm at 100 pounds pressure and 70°F which will dry the air for 25 to 500 air operated instrument installations or other compressed air uses are manufactured by Dehydraire Corp., 14-13 118th St., College Point, N. Y. Air leaving dryers has a dew point as low as minus 50°F. Units are built for either single or polyphase reactivation or

These Wheels Can Really

They're Made of the Sensational



32 ALUNDUM abrasive is entirely different from any other abrasive — made differently by a unique Norton-developed process. *There's no crushing to size* — each grain forms in the electric furnace as a single, complete, multi-pointed crystal. The result is a wheel that's *sharper* — that cuts faster and cooler.

And the grains of 32 ALUNDUM abrasive are over 99% pure fused alumina — no non-cutting slag nor pores. This means *greater resistance to dulling* — fewer dressings, longer wheel life.

The Greatest Cost-cutting Development in Abrasives in Over Forty Years

Cut Your Grinding Costs!

32 ALUNDUM®

For Faster Cutting

For Cooler Cutting

For Fewer Dressings

For Longer Wheel Life

The cost-cutting ability of 32 ALUNDUM grinding wheels has now been definitely proved — by over a year of steadily increasing use in thousands of plants. *They can cut costs for you, too.* Try them for cylindrical, centerless, surface, gear, tool and internal grinding. Ask your Norton abrasive engineer or Norton distributor for specific recommendations.

NORTON COMPANY, WORCESTER 6, MASS.

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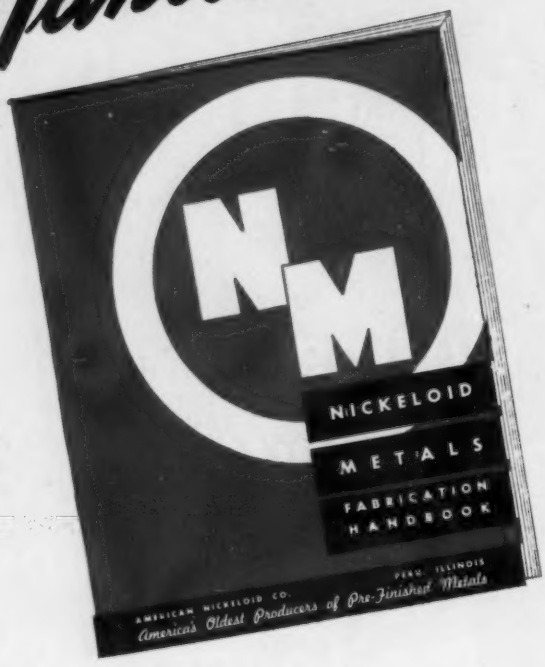
NORTON ABRASIVES

NM Handbook



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PRACTICAL SUGGESTIONS
for Fabricating
PRE-FINISHED **Nickeloid**
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● New, sixteen-page, illustrated handbook of practical fabricating suggestions of interest to all users and prospective users of pre-finished Nickeloid Metals.* Contains detailed instructions for successful handling of these beautiful metals — describes proper methods of BENDING, BLANKING, DRAWING, ETCHING, FORMING, RIVETING, SEAMING, SOLDERING, and WELDING operations. Contains general information relative to kinds, styles and patterns available in the famous NM line of metals . . . lists properties, sizes, weights, gauges, and conversion factors. Discusses typical uses and illustrates applications.

*Nickel, Chromium, Brass or Copper plated to Steel, Zinc, Brass, Copper or Aluminum — available in sheets and coils.

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steam reactivation where steam pressures of 100 pounds or over are available.

Units for handling 25 to 100 instruments are totally enclosed cabinet models. Units for 150 to 500 instruments are of open tower design with front operating panel. They are offered for either manual or automatic reversal on an 8-hour cycle. Explosion-proof construction (class 1, group D) is available.

7. Book Truck

Constructed of heavy gage steel with welded steel shelves, a new book truck, designed by Palmer-Shile Co., 16025 Fullerton Ave., Detroit 27, Mich., is for curing rubber in process

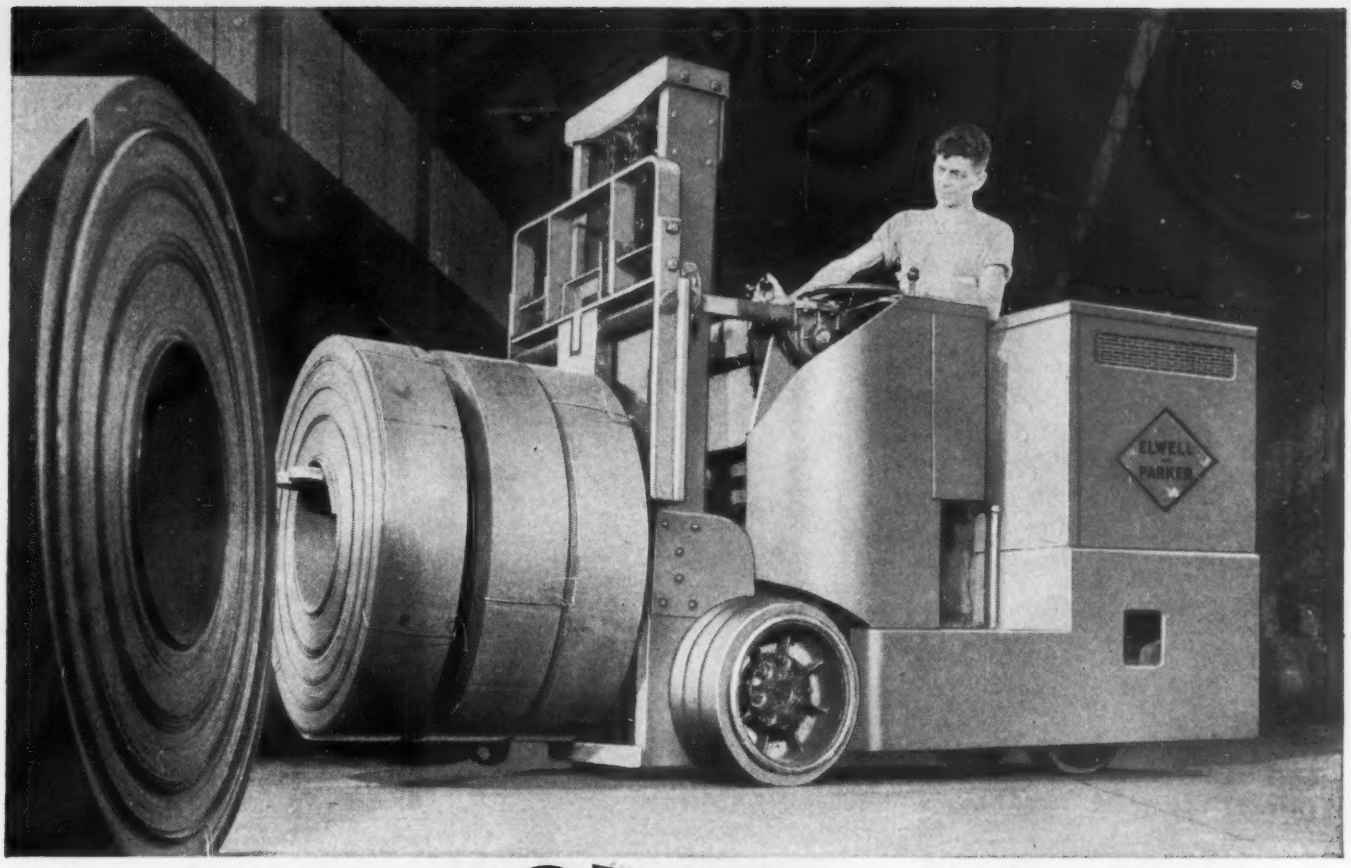
and rapid drying or curing of sheets or parts of plastic. Long extension springs permit easy raising and lowering of individual shelves. When raised, shelves are automatically held up in tilted position.

Truck is equipped with metal or rubber tired wheels or casters, but may be built with legs or with skids to accommodate lift or hand operated trucks. Strength of shelves is in accordance with individual weight requirements.

8. Machine Tool Drive

Packaged into one unit, a new feed traverse drive for machine tools has been developed by General Electric Co., Schenectady 5, N. Y. Composed of an alternating current traverse motor and a direct current feed motor, the drive is factory assembled and produces a wide range of stepless feed and traverse speeds with close feed control. Both motors in the unit drive into a differential gear which has a single output shaft.

Gear output shaft is so constructed that in many cases it may be coupled directly to the lead screw of the ma-



PLUS POWER in all sizes

another reason why Elwell-Parker Trucks are preferred

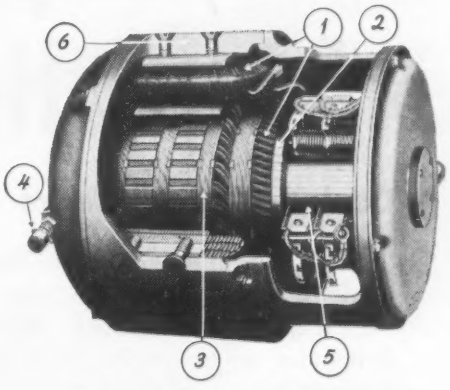
● Look at the "heart" of an Elwell-Parker truck—examine the powerful Class B Motors—and you will readily understand why they deliver more power for every dollar you invest in an electric truck. These motors, more expensive and worth it, are designed and built by Elwell-Parker exclusively for use in their trucks. The costly glass and asbestos insulation used in Class B Motors makes them practically indestructible and fire proof. They are built to handle up to 500% overload. Ball bearings are used throughout. No fuses to blow out at critical moments—none needed. Because they have more copper, greater commutator area and 8 brushes, (twice the usual number) these motors readily convert *all* the power delivered to them.

Ask your EP man for a complete account of these "plus values" in addition to the many others found only in Elwell-Parker Trucks. The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland 14, Ohio.

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

Established 1893



Some "Plus Values" of a Precision Product

(1) All coils insulated with asbestos or glass.

(2) Leads welded instead of soldered. This new and advanced art produces a uniform circuit between coil and commutator.

(3) Special quality banding wire held firmly by special clips.

(4) New type bearing grease withstands very high temperatures. Demountable armature shaft.

(5) The 8 finger-type brushes (in 4 instead of 2 holders) are firmly held and easy to change. Brushes never stick. Low current density.

(6) Field ring machined inside and out to insure uniform magnetic field.

New, Improved ACCO Hooks

Designed from Years of Experience

These Acco Sling Hooks and Sling Grab Hooks are made of fine grain steel—drop forged—normalized—heat treated—tempered. Material around the eye is heavier, so as to give extra strength where it is needed.

Acco Sling Hooks are made for chain sizes from ⅜" to 1½"—Sling Grab Hooks from ⅜" to 1".

Get in touch with your AMERICAN CHAIN distributor. Whatever your chain needs, buy AMERICAN—the complete chain line.

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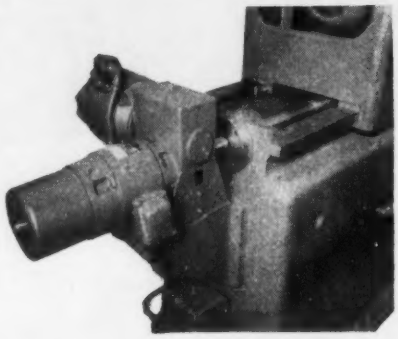
chine. By installing wide speed range control for the feed motor, all feed speeds required may be obtained without additional gear changes. To install, gear end of the unit is mounted on machine to be driven. Control for



motor is standard and may be mounted wherever convenient.

Traverse speed of 405 revolutions per minute and a feed speed range of 63 to 6.3 revolutions per minute are obtainable. Feed speed ranges of 20:1 may be provided.

9. Gravity Conveyor

Light in weight, an aluminum gravity wheel type conveyor designed to increase portability of conveyor installations is announced by Rapids-Standard Co. Inc., 342 Peoples National Bank Bldg., Grand Rapids 2, Mich. Manufactured in 5, 6, 8 and 10 foot lengths 12 inches wide, self locking Rapid-Flexible hook and bar couplers permit ready coupling to other equipment made by the company.

No tools are necessary to set up sections for operation. Bar end couplers are of 17-ST, a tough aluminum alloy. Hook end coupler is fabricated of steel to withstand abuse. Aluminum conveyor is corrosion proof and will withstand weathering.

Standard rating of a 31½ pound 8 foot section with 10 sealed ball bearing wheels per foot is 600 pounds or 75 pounds per foot. A 3-inch decline in an 8 foot section will move materials smoothly.

10. Snagging Grinder

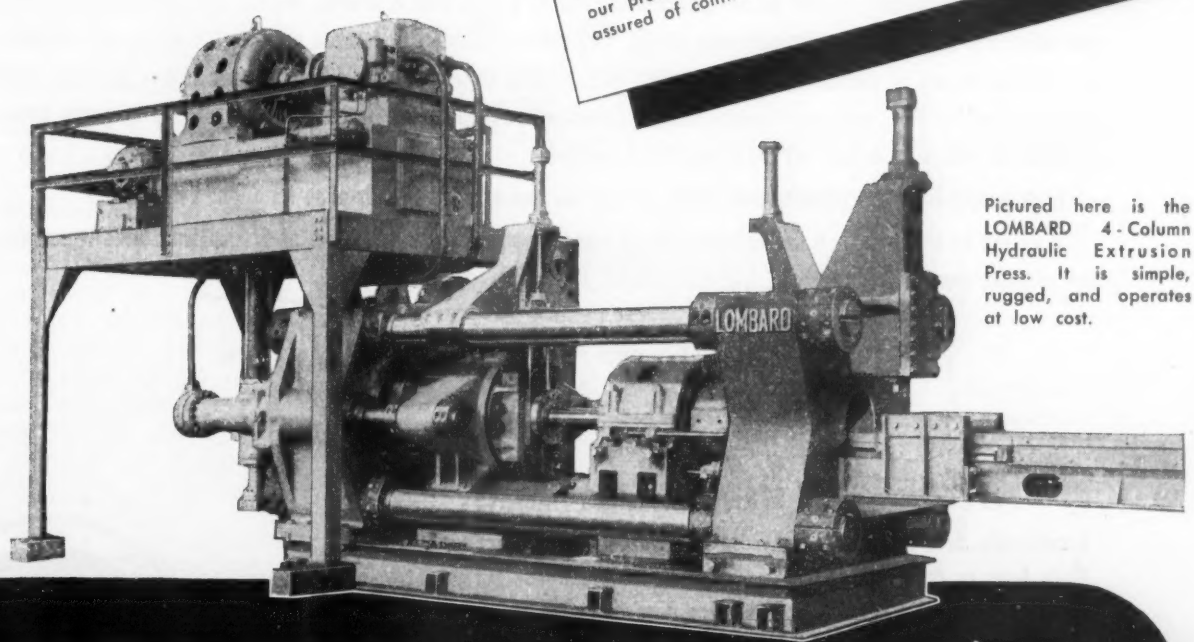
Carrying two 3 x 12 x 24-inch grinding wheels, the No. 35 twin motor variable speed snagging grinder, made by Standard Electrical Tool Co., 2504 River Rd., Cincinnati 4, O., will operate with each wheel entirely independent of the other. Powered by two 7 1/2-horsepower motors, the grinder has an infinite speed range from 1480 to 2200 revolutions per minute. Using this speed range permits operation of the wheel at a constant

LOMBARD

Simplicity of Design
★
Economical Operation

MECHANICAL PUNCH AND FORMING PRESSES · EXTRUSION PRESSES · COMPLETE HYDRAULIC SYSTEMS · INTENSIFIER SYSTEMS · COMPLETE PLANT DESIGN · COMPLETE CONSTRUCTION AND INSTALLATION OF INDUSTRIAL BUILDINGS AND MACHINERY

If it takes money to make money, then LOMBARD service and products are the logical investments for manufacturers who use hydraulic and mechanical presses. The LOMBARD CORPORATION has a great deal to offer to such manufacturers. Consider our 4-column hydraulic extrusion press, for instance. This machine is a development of a leading industrial engineering organization. It is furnished as a self-contained, compact unit. It is easy to install and set up, and simple to rearrange to production lines as requirements demand. LOMBARD presses are designed and built to meet specific applications. Our engineers supervise their installation and remain on hand until the machines are in full operation. An industrial engineering organization should feel a deep responsibility for its products and services, and it is the weight of this responsibility that colors the relationship between the LOMBARD CORPORATION and its clients. So long as we feel that ANY of our products is "our baby", Lombard customers may be assured of continued service and satisfaction.



Pictured here is the LOMBARD 4-Column Hydraulic Extrusion Press. It is simple, rugged, and operates at low cost.

LOMBARD CORPORATION

Hydraulic and Mechanical Presses

EMPIRE BUILDING · YOUNGSTOWN 3, OHIO

We're Delivering *Lighter* Gauge STAINLESS STEEL SHEETS

To your specifications when you want it.

The Washington Steel Corporation is able to supply fabricators with a constant flow of *MicroRold* Stainless Steel Sheets, Type 302 or 304 in a range from 24 to 30 gauge by 36 inches wide by any length.

Many fabricators have specified certain gauges which may be heavier than is actually needed. Now, because of improved cold rolling mill equipment, manufacturers may specify *MicroRold* cold rolled sheet in the actual gauge required for a specific job and be assured of getting a product with virtually no crown and held to a tolerance of plus or minus .001" of the specification. The "no crown" feature of *MicroRold* Stainless Steel and overall accuracy of gauge means economies as more area or parts per ton of material is realized.*

From regular users now polishing their sheets, we are told that output per ton is often more than doubled.

If we can be of service or if further information is needed, we hope you will call one of Washington Steel's representatives or direct your inquiry to the mill.

*Example of 21% saving

.012" × 36" × 96" = 24 sq. ft. = 12# @ 62.25¢ lb. = $7.47 = 31.00¢ sq. ft.
.024" × 36" × 96" = 24 sq. ft. = 24# @ 39.50¢ lb. = $9.38 = 39.50¢ sq. ft.

MicroRold STAINLESS STEEL MEANS

Remarkable Accuracy of Gauge
More Area or Parts per ton
Consistant Physical Properties
More Dense Surface Structure
Easier and Less Expensive to Polish

WASHINGTON STEEL CORPORATION
WASHINGTON, PENNSYLVANIA

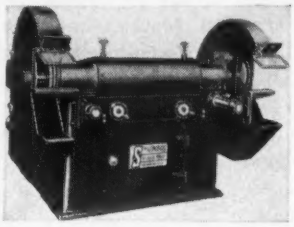
Broad Street Station Bldg.
Philadelphia 3, Pa.

2565 Guardian Bldg.
Detroit 26, Mich.

1 North LaSalle Street
Chicago 2, Ill.

9500 surface feet per minute as its diameter decreases.

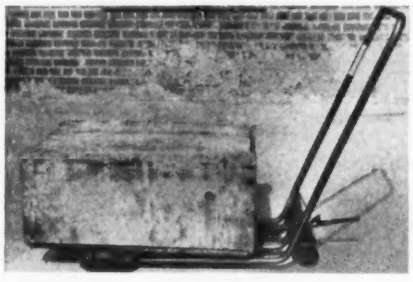
Other features of the grinder are independent spindles, magnetic starters, shaft lock, hand wheel speed controls and an interlocking arrange-



ment which prevents overspeeding of grinding wheel. Full wheel diameter cannot be mounted until the hand wheel control has been reversed to its original position, preventing overspeeding.

11. Hand Truck

Featuring a "prybar" to simplify lifting and moving of objects many times its weight, an all welded hand truck, announced by Whiting Engineering & Mfg. Co., Charlotte, N. C., weighs only 60 pounds. Constructed primarily of steel tubing, formed into shape and welded with Lincoln shielded arc electrodes, the truck has



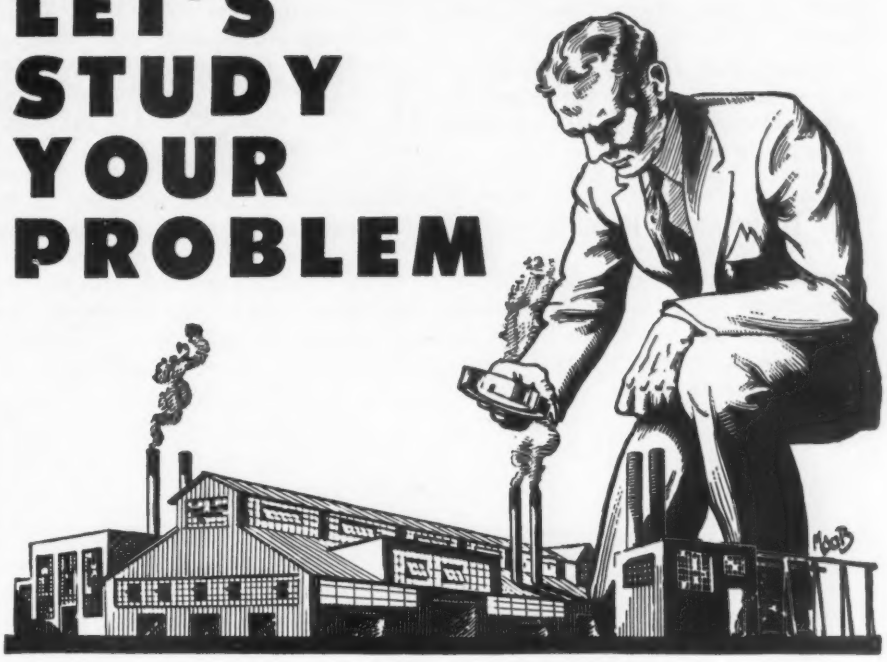
roller bearing wheels of small diameter on the front and casters at the rear.

Prybar slips under edge of object and is then pushed down with one foot, raising it 1½ inches and at the same time raising the handle. This multiplies the lift and permits the object's edge to go over the top of the front set of rollers. A quick thrust forward completes the loading. Loads up to 600 pounds may be handled.

12. Nut Setter

Made to handle large lag and wood screws as well as nuts, an air powered heavy duty nut setter, designated as model 7040 by its manufacturer, Aro Equipment Corp., Bryan, O., is furnished with a side handle and a 7/16-inch hex ball lock adapter threaded directly to the tool spindle. Desired torque is obtained by regu-

LET'S STUDY YOUR PROBLEM



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Is it Increased Capacity?

Is it Materials Handling?

Is it Processing?

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Engineers and Architects
DETROIT 26, MICHIGAN

lating speed through a regulator located on the side of the throttle handle.

Overall tool length is 8½-inches and weight is 6 pounds. Speed is adjustable from 500 to 1000 revolutions per minute.

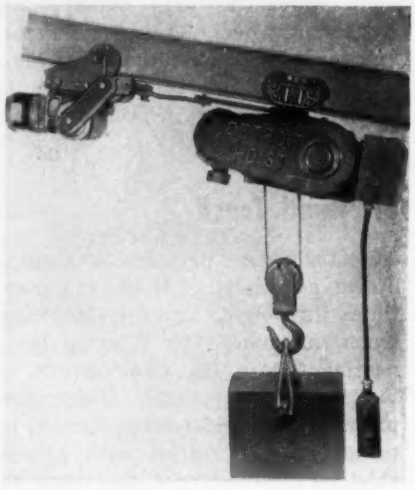
13. Tachometer Head

Speeds between 100 and 10,000 revolutions per minute may be measured with the tachometer made by Metron Instrument Co., 432 Lincoln St., Denver 9, Colo., which contains one rotating part mounted in a permanently lubricated ball bearing. Electrical connections are made through a ½-inch conduit or fittings to inside terminals. All parts are sealed against dirt.

Head may be operated in any position and is usable with any of the company's indicators or recorders. Direct coupling without need of a speed changing drive is provided for all speed ranges. Its aluminum case measures 2 3/16 x 1 15/16 x 5 inches. Operating torque is approximately 1/30 ounce-inches. Mounting is provided by tapped holes in both bottom and end.

14. Monorail Tractor

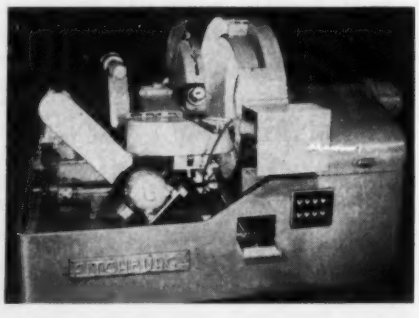
Electric motor propelled, the Trojan monorail tractor, made by Detroit Hoist & Machine Co., 8226 Morrow St., Detroit 11, Mich., can be applied to travel existing hand operated monorail hoists by power. It may also be used to travel monorail conveyor lines, open and close garage and hangar doors and travel hand operated crane bridges, the latter with slight alterations.

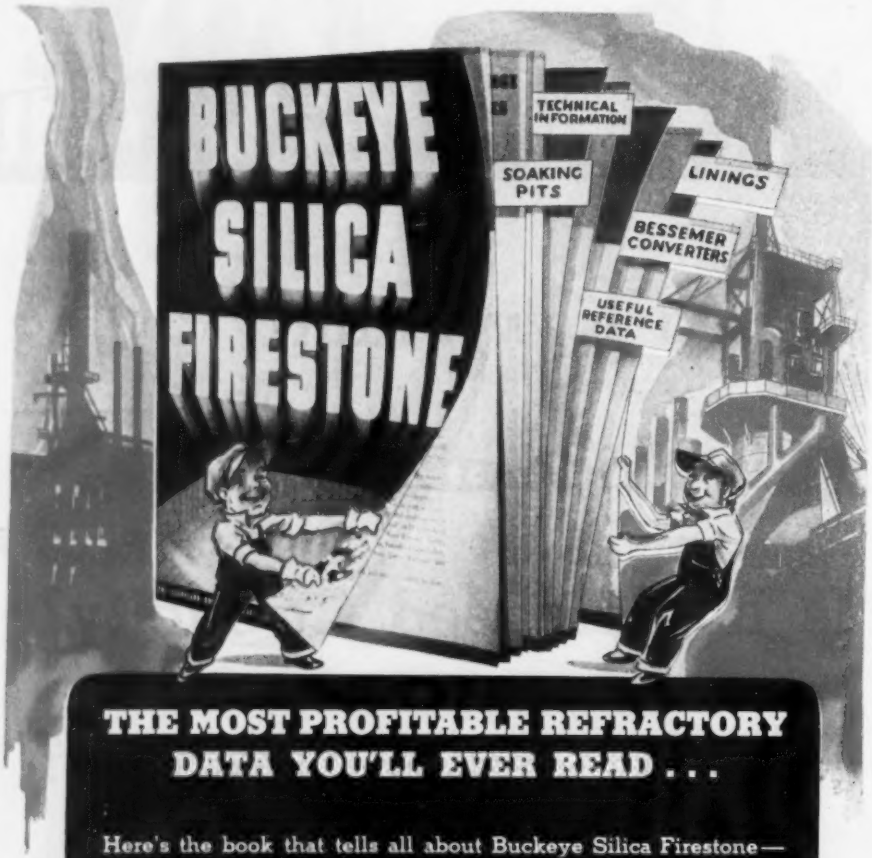


Tractor is suspended on a pair of wheels which run on the top surfaces of an overhead, monorail beam flange. It is so fulcrumed that its own weight exerts a pressure against a second pair of wheels which run on the underside of the flange, this "biting action" resulting in the ability to move comparatively heavy loads even up inclined monorails.

15. Valve Seat Grinder

Three or more valves are in constant contact with a single grinding wheel and production of 2160 pieces per hour are features of the Consta-Contact valve seat grinder introduced by Fitchburg Grinding Machine Corp., Falulah Rd., Fitchburg, Mass. Utilizing automatic loading and un-





THE MOST PROFITABLE REFRACTORY DATA YOU'LL EVER READ . . .

Here's the book that tells all about Buckeye Silica Firestone—gives comparative data and figures on its lower cost and greater efficiency. Steel men will be interested in the many pages devoted to results obtained from using Buckeye in soaking pits, converters, etc. Interesting, too, are the testimonials from well known steel mill executives. Send for your copy . . . it will be mailed immediately.

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by AMERICAN WELDING

Compared with any other manufacturing method, *welded* stainless steel rings prove to be equally efficient and much less expensive. Records show that there is a substantial

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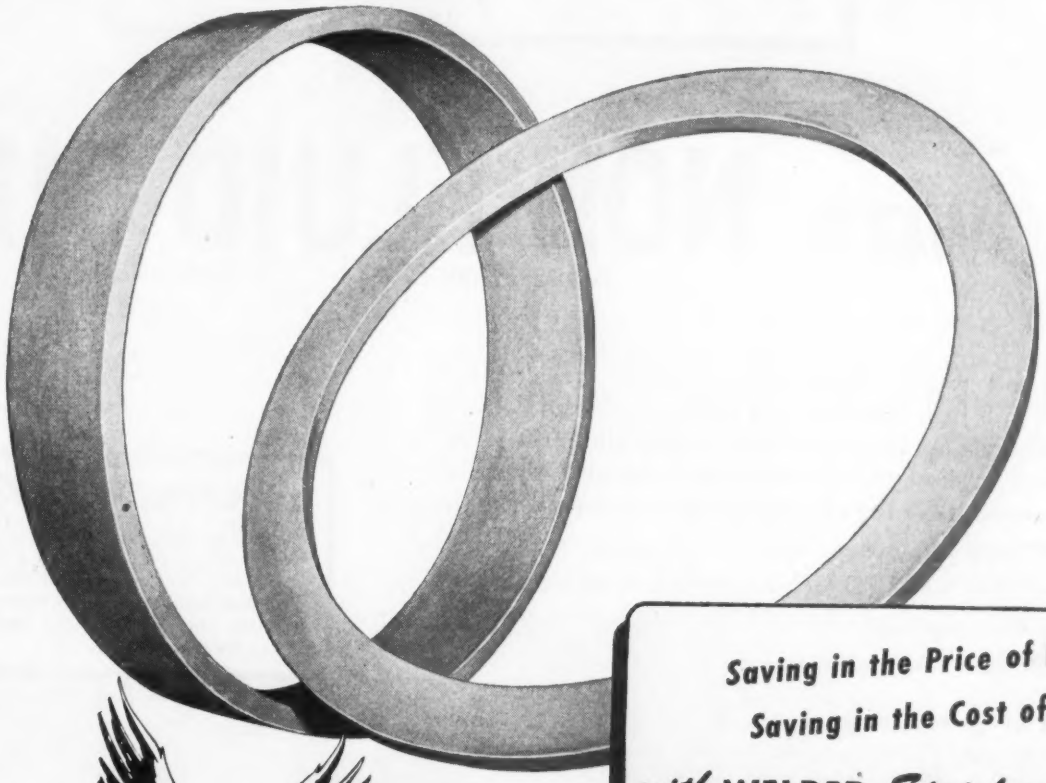
SAVING IN THE COST OF TOOLING

when stainless rings are produced by the welding process.

If you use stainless rings, or any other welded product, a few moments spent with our representative may prove to be very advantageous. May we hear from you?



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Saving in the Cost of Tooling
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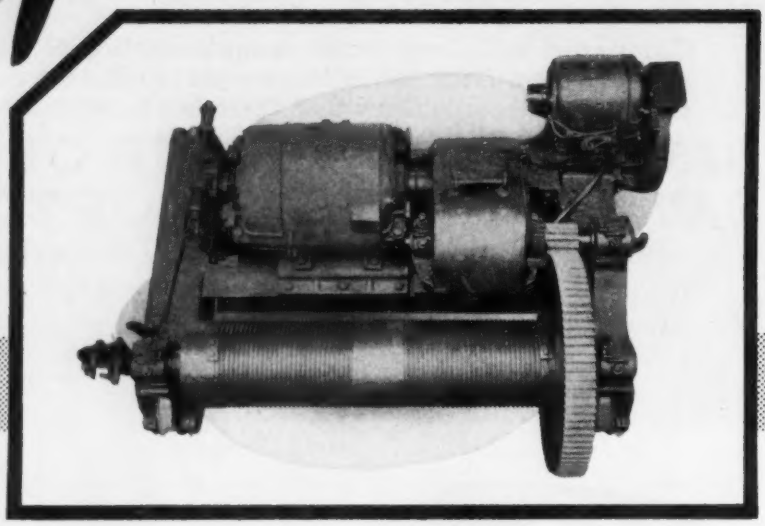
Stop OIL SHOWERS FROM CRANE MOTORS



WITH NON-FLUID OIL

TRADE MARK REGISTERED

Constant oil and grease leakage from overhead crane motors not only results in high lubricant and application costs but also stock cleaning costs are increased when oil deposits must be removed. In fact, on sheet metal products it is virtually impossible to remove these spots in the pickling process or even when the sheets are annealed.

The answer? NON-FLUID OIL . . . saves time and money because it does not drip or leak. You get *clean* lubrication and *clean* products at lower cost.

Current Quote

"Prior to using NON-FLUID OIL, we had trouble daily with our machines running hot and corroding. Since changing to NON-FLUID OIL, we have not had any trouble."

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292 Madison Avenue, New York 17, N. Y.

Please send me testing sample of NON-FLUID OIL to be used in the following machines:

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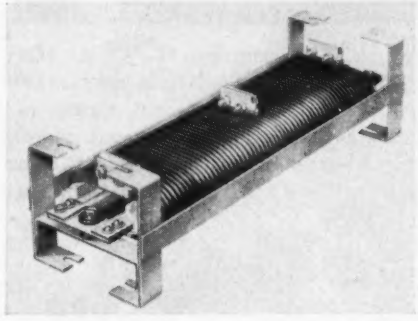
292 MADISON AVENUE, NEW YORK 17, N.Y.

loading, the machine grinds valves to size while they pass through a 90-degree sector of the grinding wheel face.

Grinder has a belt driven vertical grinding wheel and a vertical turret having 12 driving spindles to receive the valve stems. Grinding wheel rotates at 5000 surface feet per minute and the valves at 80 to 110 surface feet per minute. Grind angle is altered by pivoting the table which carries the turret, turret drive and spindle motors.

16. High Current Resistors

Applicable for use as starting, dynamic braking, field discharge and plugging resistors on alternating and direct current motor controllers and other intermittent duty high current applications, Edgeohm high current resistors, made by Ward Leonard Electric Co., Mount Vernon, N.



Y., are rated at 2200 watts. Resistances are from 0.32 to 4/35 ohms and continuous current capacities are from 21 to 79 amperes.

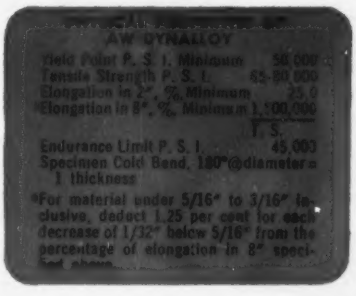
A single resistor with a duty cycle of 5 seconds on, out of each 80 seconds is rated at 17,000 watts, based on a 375° C temperature rise. Single units are offered with stamped steel brackets while multiple units up to four are furnished in a single open frame. Frames may be stacked in banks.

17. Terminal Block Kit

Designed for experimental work and maintenance operations, a terminal block kit, made by Curtis Development & Mfg. Co., 1 North Crawford Ave., Chicago 24, Ill., is capable of producing any number of terminals from 1 to 14. The "build-up" feature is suited for experimental work where one of a kind parts or parts in small quantities are needed.

Kit No. 200 contains necessary molded sections, terminals and screw assemblies and kit No. 201 has a supply of end brackets, partitions, threaded rods, screws, nuts and washers. Thus with the correct ratio of these kits, all sizes of blocks may

Here's a new and versatile high strength, low alloy steel which makes it possible to design stronger structures or to reduce dead-weight as much as 40% without any reduction in strength or safety. Buses, trucks and freight cars built with AW Dynalloy haul more payload and less dead-weight. Dynalloy has four to six times the resistance to atmospheric corrosion as plain carbon steel or approximately twice that of copper bearing mild steel. Greater resistance to impact, abrasion and fatigue together with excellent weldability and cold forming properties give AW Dynalloy advantages that can increase your profits and decrease your shop costs. Get complete information about AW Dynalloy now.


AW DYNALLOY
Yield Point P. S. I. Minimum 50,000
Tensile Strength P. S. I. 65-80,000
Elongation in 2", % Minimum 25.0
*Elongation in 8", % Minimum 1,500,000 / T. S.
Endurance Limit P. S. I. 45,000
Specimen Cold Bend, 180° @ diameter = 1 thickness
*For material under 5/16" to 3/16" inclusive, deduct 1.25 per cent for each decrease of 1/32" below 5/16" from the percentage of elongation in 8" specified above.

Write for your copy of our New Folder D-14. It contains helpful information and maximum sizes.

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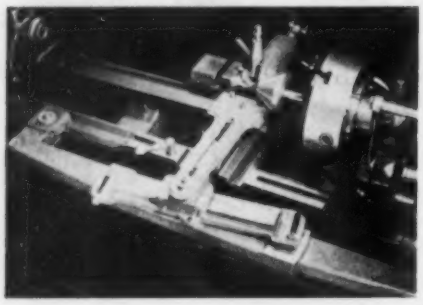
be built, meeting specific requirements. They are recommended for installations where the temperature does not exceed 400° F.

18. Taper Attachment

Tapers up to 4 inches per foot, 20 degrees maximum in either direction and 16 inches long may be made in one setting of the heavy duty taper attachment for lathes, developed by Master Taper Co., 126 North



Clinton St., Chicago 6, Ill. The attachment is offered in two sizes, 34 and 40 inches between arms and for V and flat ways. It can be furnished for all lathes with a 13 to 26 inch swing.

Swivel bar has V-ways with the ends graduated in degrees on one end and in inches per foot on the other. The sliding fixture has a long bearing on the swivel bar with gibs to compensate for continuous usage. The slotted overarm is attached to the cross slide as shown, or with finished adjustable bar.

19. Air Hydraulic Press

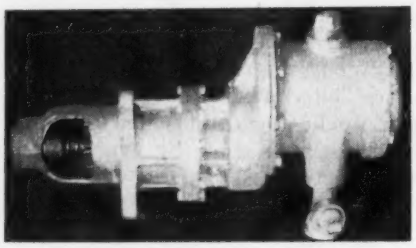
Assembling, flanging, broaching, forming, marking, riveting, crimping, etc. may be performed with the new

1200 pound capacity air-hydraulic press manufactured by Air-Hydraulics Inc., 401 Broadway, New York 13, N. Y. Its capacity is based on an air inlet pressure of 100 pounds and a 12 to 1 ratio.

Press has a 6-inch throat, 2½-inch stroke, ¾-inch ram and 5-inch square platen. Lugs in base make it suitable for bench mounting. Spring or power return are optional. It is constructed with heavy ribbed castings and a solid steel shaft that affords a vertical adjustment up to 6 inches.

20. Engine Starter

Reduced fire hazard is an advantage claimed for the Airstarter for internal combustion engines, developed by Bethlehem Supply Co. of California, P. O. Box 3128, Terminal



Annex, Los Angeles 54, Calif. Developed to fit practically any make or model of multicylinder engine, including gas and high speed diesel, the starters are made in several sizes and in particular specifications re-

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40" Between Uprights.

42" Front to Back.

36" Stroke.

20" Shut Height.

25 Ton Hydro-Pneumatic Cushion.

Complete with pumps and electrical equipment for operation on 220/440 volt, 3 phase, 60 cycle current, including 2-40 H. P. General Electric Motors.

Rapid traverse speed 400" per minute.

Drawing speed adjustable from 18" to 36" per minute.

Selector switch for choosing any one of seven different automatic operating cycles.

Price **$28,000.00** F.O.B. CARS ERIE, PA.

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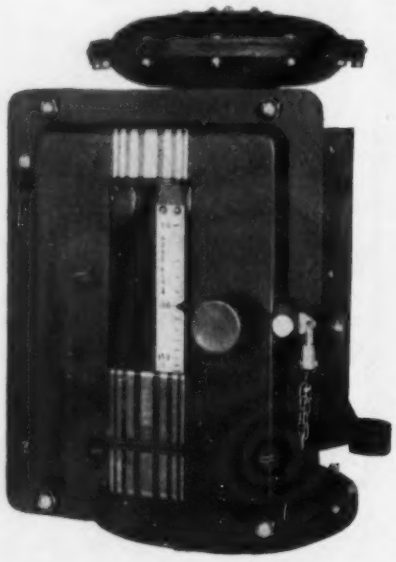
quired for any engine.

Use of these starters may be in plant engines and in field equipment, particularly that operating under hazardous conditions. Reserve power and fast cranking speeds for quick starting are provided.

21. Air-Fuel Controller

Electric motored valve drives are employed in the new air-fuel ratio controller, introduced by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa. It is a balance type instrument with ample flexibility to meet any operating condition.

Ratio of the controller may be adjusted manually for operation with



fuels of various Btu content. As fuel flow changes, the instrument maintains air-fuel ratio constant at the desired control point, or it can provide automatic variation of ratio, increasing or decreasing the per cent of air at reduced fuel flows. It is designed for mounting on the furnace panel.

DEVELOPED BY . . .

22. Hobart Bros. Co., Troy, O., Softcast A, copper-nickel alloy electrode having a mineral flux coating for metallic arc welding. Nonferrous deposit is malleable, easily machinable and has tensile strength of cast iron.

23. Finke Co., Brooklyn 20, N. Y., Roto-Grind method of dressing wheel bond between the diamond concentration, performed by conical cross grinding. Tool used removes enough bond to expose dead buried diamonds and restore cutting edges.

24. Ideal Industries Inc., Sycamore, Ill., voltage test for testing continuity of circuits, 110 to 550 volts alternating current, 110 to 600 volts direct, blown fused, grounded side of line, frequency, etc.

25. Hanna Engineering Works, Chicago 22, Ill., air and hydraulic valves, redesigned to incorporate a protective dust seal of neoprene. Valve disk and stem are pressure lubricated radially outward from center.

26. Ronaflex Tubing Co. Inc., Philadelphia, flexible tubing with flexibility of rubber and sturdiness of steel, will withstand pressures of 980 pounds per square incn. It may be used for air, water, gases, oil, volatiles, etc.

27. Air-Speed Tool Co., Los Angeles, Calif., straight and pistol grip type air powered hand drills. Air pressure of 90 to 100 pounds drives it at 14,000 revolutions per minute. Speed is controllable.

28. Hapman Conveyors Inc., Detroit 21, Mich., unbalanced load vibrator, offered as an accessory to the company's rubber flighted sealed pin chain pipe conveyors.

29. Ohio Injector Co., Wadsworth, O., corrosion resistant stainless steel valve, manufactured in ½ to 2-inch sizes. It is of outside screw and yoke type with bolted bonnet, tapered wedge and screwed ends.

30. Westinghouse Electric Corp., Pittsburgh 30, Pa., Flexarc carbon arc torch for brazing, soldering and supplying heat for light forging, preheating before welding and tempering operations. Plugs fit WT midget marvel and limited input welders.

31. Buehler Ltd., Chicago 1, Ill., AB Diamet Hyprez diamond polishing compound for metallographic specimens. It is offered in various particle sizes and with applicator gun and polishing table.

32. Goodyear Tire & Rubber Co., Akron, O., an impact-cushioning idler for belt conveyors, consisting of rubber rings mounted on the idler core. Maximum deflection is six times greater.

33. Weston Electrical Instrument Corp., Newark, N. J., a quick reading all metal humidity indicator, accurate within plus or minus 1 per cent. It is of wet and dry bulb type. A slide rule calculator indicates relative humidity from 10 to 100 per cent.

34. Sundstrand Machine Tool Co., Rockford, Ill., constant displacement, hydraulically balanced pump for continuous duty at 1000 pounds per square inch operating pressure. It will be available in capacities from 2 to 75 gallons per minute.

35. Dodge Mfg. Corp., Mishawaka, Ind., a solid steel fractional horsepower variable pitch sheave which provides fine adjustment through use of 20 threads. It is offered in standard bores of ½, ⅝ and ¾-inch.

36. Acro Co., Cleveland 4, O., "self-healing" spray coating material for long-term protection of storage vessels, bridges, metal structures exposed to weather.

37. A. D. McBurney (distributor), Los Angeles 14, Calif., the instantly working, adjustable Manville-Acme pipe cutter. It features a push button release and lock, enabling work on any pipe size from ¼ to 2 inches.

38. American Instrument Co., Silver Spring, Md., electric Hygro-Cel, for measuring the evaporation of moisture from molds. By placing instrument in contact with mold surface, evaporation is accurately determined by an electric hygrometer sensing element.

39. General Welding Co., Cleveland 3, O., a line of all welded toggle clamps, designed to withstand severe service of heavy fabricating.

40. Wick Co., Meriden, Conn., tap grinding fixture which takes taps from No. 8 to ⅝-inch. It accommodates taps with two to six flutes, right or left hand and mounts tap between centers on cutter grinder or on lathe equipped with a tool-post holder.

41. Photoswitch Inc., Cambridge 42, Mass., type 2A10C photoelectric excess-smoke indicator which gives continuous indication to boiler room of condition of gases passing through the flue.

42. Flexrock Co., Philadelphia 4, Pa., M. F. P. machine shop floor patch. It is grease and oil resistant and may be applied over concrete or wood. Shipment is as a complete unit.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

PROGRESS REPORTED—Although most steel producers are falling short of their mark in catching up on shipment arrearages by yearend, nevertheless, some mills are making noteworthy progress. Demand is far in excess of supply, but the general trend in this respect seems to be toward improvement.

Some steelmakers will be reasonably current with commitments by Feb. 1. Still others expect their position to be much better balanced by the middle of that month. Other mills will require more time, but all in all, encouraging headway is being made.

MANDATORY CONTROLS UNLIKELY—Indications are Congress will not grant the administration broad allocation authority over steel distribution. However, some form of voluntary allocation is expected to come out of present discussions in Washington. Meanwhile, with the administration pressing for at least limited controls, the steel producers are increasing efforts to become current with their commitments.

SHEET SUPPLY LIMITED—There is little prospect of any material improvement in sheet supply until well on toward mid-1948. All of the mills are booked to capacity, and except where new facilities are being brought in, sellers generally are unable to supply any more new tonnage against first quarter consumer quotas.

The situation in sheets is as acute as at any time since the war ended. This is reflected in reported increasing activity in the gray market where prices up to $300 per ton are reported quoted. Also, manufacturing interests, increasingly, are seeking to solve the sheet supply problem by getting into the steel business on their own. Last week Hudson Motor Car Co. leased a plant and plans to turn out 10,000 tons of autobody sheets monthly beginning the second quarter.

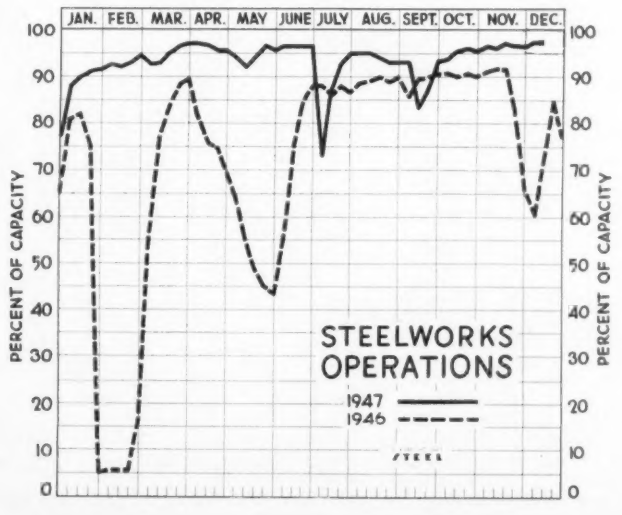
PRICES HOLDING—Except for tin and terne plate, finished steel prices are holding firmly at established levels. Continued rising raw material costs, and a possible wage increase over coming months, however, present a threat to stability. In fact, within recent weeks extra cards on alloy bars and strip have been adjusted upward. The tin plate advance was in line with expectations.

SCRAP STALEMATE CONTINUES—Test of current scrap steel prices still is awaited. There is nothing in the market situation to indicate any material change in conditions from those recently prevailing.

Bethlehem Steel Co. has purchased 1 million tons of unprepared scrap from the Chinese government and first shipment of a lot is scheduled to arrive in January at Baltimore. The scrap will cost Bethlehem $30 million, including $18 million for transportation.

STEEL OUTPUT RISES—Steel production rose to a new peacetime peak last week of about 1,710,000 net tons, highest since the week ended May 19, 1945. Production was scheduled at fractionally over 97.5 per cent.

PRICE COMPOSITES—Due to a slight easing in the eastern market, STEEL's composite price average on steelmaking scrap was slightly lower at $40.25 compared with $40.42 the preceding week. Other composite averages held unchanged.



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Dec. 13	Change	Same Week 1946	Same Week 1945
Pittsburgh	102	— 0.5	69	78.5
Chicago	95.5	+ 0.5	78	90
Eastern Pa.	93.5	None	63	80
Youngstown	91	+ 1	50	81
Wheeling	93.5	None	80.5	95
Cleveland	91.5	+1	95	85
Buffalo	88.5	None	83.5	88.5
Birmingham	102	— 1	55	95
New England	85	None	90	80
Cincinnati	85	— 2	81	67
St. Louis	96	+ 9	72.5	65.5
Detroit	92	None	93	89
Estimated national rate	97.5	None	72.5	83.5

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

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COMPOSITE MARKET AVERAGES

	Dec. 13	Dec. 6	Nov. 29	One Month Ago Nov., 1947	Three Months Ago Sept., 1947	One Year Ago Dec., 1946	Five Years Ago Dec., 1942
Finished Steel	$76.09	$76.09	$76.09	$76.09	$75.41	$64.75	$56.73
Semifinished Steel	57.20	57.20	57.20	57.20	56.80	41.10	36.00
Steelmaking Pig Iron	36.31	36.31	36.42	36.38	36.14	29.10	23.00
Steelmaking Scrap	40.25	40.42	40.42	40.42	37.83	27.69	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, rails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Dec. 13, 1947	Nov., 1947	Sept., 1947	Dec., 1946
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.55c
Steel bars, del. Philadelphia	3.318	3.318	3.28	2.91
Steel bars, Chicago	2.90	2.90	2.90	2.55
Shapes, Pittsburgh	2.80	2.80	2.80	2.35
Shapes, del. Philadelphia	2.954	2.954	2.94	2.48
Shapes, Chicago	2.80	2.80	2.80	2.35
Plates, Pittsburgh	2.95	2.95	2.95	2.50
Plates, del. Philadelphia	3.17	3.17	3.15	2.558
Plates, Chicago	2.95	2.95	2.95	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.48
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.19
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.90	†3.675
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.481
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.219
Sheets, No. 10 galv., Gary	3.90	3.90	3.90	†3.675
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.462
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.162
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.675	3.05
Wire nails, Pittsburgh	4.625	4.625	4.25	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	39.00
Rerolling billets, Pittsburgh	47.50	47.50	47.50	39.00
Wire rod 7/32 to 1/4-inch, Pitts.	3.05c	3.05c	2.925c	2.425c

‡ Base, No. 5 to 7/32-in.

Pig Iron

	Dec. 13, 1947	Nov., 1947	Sept., 1947	Dec., 1946
Bessemer, del. Pittsburgh (N.&S. sides)	$37.913	$37.83	$37.83	$31.77
Basic, Valley	36.00	36.00	36.00	29.50
Basic, eastern del. Philadelphia	38.84	38.84	38.72	31.93
No. 2 fdry., del. Pgh. (N.&S. sides)	37.41	37.413	37.33	31.27
No. 2 fdry., del. Philadelphia	39.34	39.34	39.22	32.43
No. 2 foundry, Chicago	36.00	36.00	36.00	30.00
No. 2 foundry, Valley	36.50	36.50	36.50	30.00
Southern No. 2, Birmingham	34.88	34.88	34.51	26.88
Southern, No. 2, del. Cincinnati	38.74	38.544	39.38	30.94
Malleable, Valley	36.50	36.50	36.50	30.00
Malleable, Chicago	36.50	36.50	36.50	30.00
Charcoal, low phos., fob Lyles, Tenn.	50.00	46.40	44.00	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.00	$40.00	$38.00	$28.50
Heavy melt. steel, No. 2, E. Pa.	42.00	42.50	36.75	27.38
Heavy melt. steel, No. 1, Chicago	38.75	38.75	38.75	27.19
Heavy melt. steel, No. 1, Valley	39.75	39.875	39.50	28.75
Heavy melt. steel, No. 1, Cleveland	39.25	39.625	38.25	28.50
Heavy melt, steel, No. 1, Buffalo	42.50	41.81	39.00	26.63
Rails for rerolling, Chicago	59.00	56.25	46.25	31.00
No. 1 cast, Chicago	55.50	49.00	43.50	36.88

Coke

Connellsville, beehive furnace	$12.25	$12.25	$12.00	$8.75
Connellsville, beehive foundry	14.50	14.50	14.50	9.50
Chicago, oven foundry, del.	18.60	18.60	18.50	15.29

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $65 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60; sales in open market $66 to $92.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-$70.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to 1/4-in., inclusive, $2.80-3.30 per 100 lb. 5/16 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.351c; Phila., del., 3.318c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

†Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.02c; New York, del., 3.12c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 4.001c; Philadelphia, del., 3.968c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.85c-3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.27c; Philadelphia, del., 4.17c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.95c-4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.45c-4.55c; copper-iron or pure iron, 4.80c-4.90c. Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.90c-3.95c; Granite City, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c.

Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c.

Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c.

Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c, over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.90c; Granite City, Birmingham, Sparrows Point, 4.00c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $14.10.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c*; Geneva, Utah, (base, del.), 3.125c; New York, del. 3.27c; Phila., del., 3.17c; Boston, del., 3.423c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 4.45c, basing points.)

* At Claymont, Del., 3.30c base price applies on all grades lower than flange quality steel.

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.02c; Phila., del., 2.954c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.
Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.
Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads
Bright, basic or bessemer.....*$3.55-3.80
Spring (except Birmingham)....**$4.25-**4.50
Wire Products to Trade
Nails
Standard and cement-coated .....†$4.25-5.00
Galvanized .....‡$4.00-4.75
Staples, polished and galvanized.....$4.25-5.00
Wire, Merchant Quality
Annealed (6 to 8 base) ..... §$4.20
Galvanized (6 to 8 base) ..... §$4.65
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier....††91-101
Barbed wire, 80-rod spool ..... ††101
Barbless wire, twisted 101
Fence Posts (no clamps)..... ††90
Bale ties, single loop ..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del.), $4.56, bright basic only.
** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.
† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.
‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.
§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.
†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2¼"	12	20.47	24.54	19.86	23.80
2½"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe, Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $86.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
9/16 and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	46 off	.....
½-in. and smaller	.....	44 off
½-in.-1-in.	44 off	.....
9/16-in.-1-in.	.....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	.....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws
(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off
Square Head Set Screws	
Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
7/16-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$37.00	$37.50	$38.00	$38.50
Newark, N. J., del.	39.02	39.52	40.02	40.52
Brooklyn, N. Y., del.	....	40.80	44.30	....
Philadelphia, del.	38.84	39.34	39.84	40.34
Birmingham, base	32.88*	33.38*	....	....
Baltimore, del.	....	40.42	....	....
Chicago, del.	....	36.72	....	....
Cincinnati, del.	....	38.74	....	....
Newark, N. J., del.	....	39.14	....	....
Philadelphia, del.	....	38.96	....	....
St. Louis, del.	....	37.77	....	....
Buffalo, base	36.00*	36.00*	36.50*	37.00
Boston, del.	43.128	43.128	46.63	44.13
Rochester, del.	38.02	38.02	38.52	39.02
Syracuse, del.	38.75	38.75	39.25	39.75
Canton, Massillon, O., base	35.50	36.00	36.50	....
Chicago, base	35.50	36.00	36.50	37.00
Milwaukee, del.	36.95	37.45	37.95	38.45
Muskegon, Mich., del.	....	40.21	40.71	....
Cleveland, fob furnace	35.50*	36.00*	36.50*	37.00
Akron, del.	37.34	37.84	38.34	38.84
Duluth, base	36.00	36.50	37.00	37.50
Erie, Pa., base	35.50	36.00	36.50	37.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	36.50	37.00	....	....
St. Louis, del.	37.33	37.83	....	....
†**Neville Island, Pa.,** base	36.00	36.50	36.50	37.00
Pittsburgh, del., N.&S. Sides	36.913	37.413	37.413	37.913
Provo, Utah, base	36.00	36.50	....	....
Seattle, Tacoma, Wash., del.	....	43.03	....	....
Portland, Oreg., del.	....	43.03	....	....
Sharpsville, Pa., base	36.00	36.50	36.50	37.00
Steelton, Pa., base	37.00	37.50	38.00	38.50
Struthers, O., base	36.50	37.00	37.00	37.50
Swedeland, Pa., base	41.00	41.50	42.00	42.50
Troy, N. Y., fob furnace	39.50	....	40.00	....
Toledo, O., base	35.50	36.00	36.50	37.00
Cincinnati, del.	39.35	39.85	....	....
Youngstown, O., base	36.00	36.50	36.50	37.00
Mansfield, O., del.	39.28	39.78	39.78	40.28

† To Neville Island base add: 72.6c for McKees Rocks, Pa., $1.111 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; $1.463 Oakmont, Verona; $1.639 Brackenridge.

*Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Aug. 13; $4.00 higher for No. 2 foundry and malleable and $3.50 higher for basic at Buffalo, and $3.75 higher at Cleveland, effective on shipments during week ended Dec. 14.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron:** Si 14.01-14.50%, $70.75, Jackson, O.; $73.75, Niagara Falls; $73, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$50.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00. Philadelphia, $44.376, delivered. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$17.85
Chicago, outside del.	17.60
Chicago, del.	18.60
Terre Haute, del.	18.15
Milwaukee, ovens	18.25
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	17.00
Cincinnati, del.	18.10
Ironton, O., ovens	16.00
Erie, Pa., del.	18.35
Painseville, O., ovens	17.10
Cleveland, del.	18.50
Buffalo, del.	18.75
Detroit, del.	18.25
Philadelphia, ovens	16.90
Swedeland, Pa., ovens	16.90
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	16.25
Pittsburgh, del.	18.21

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	19.00†
Toluol, two degrees	23.00
Industrial xylol	25.00*
Solvent naphtha	25.00*

Per pound fob works

Phenol (car lots, returnable drums)	12.00§
Do., less than carlots	12.75§
Do., tank cars	11.00§

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00*

Per ton, bulk, fob plants

Sulphate of ammonia	$35.00‡

* Effective Aug. 1. † Freight allowed up to 2 cents. ‡ Effective July 21. § Effective Oct. 1.

Refractories

Per 1000, fob shipping point

Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$30–$32

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30*	5.30*	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

* Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy (8414O)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
††New York (city)	4.91	6.12	5.82[9]	6.11	7.36	5.03	....	5.02	5.57	7.00[9]	4.75	5.06	6.76
New York (country)	4.76	5.97	5.67[8]	5.96	7.21	4.88	....	4.87	....	....	4.60	4.91	6.61
Philadelphia (city)	4.67	6.28	5.88	5.87	7.12	4.78	5.68	4.83	5.53	7.15[9]	4.55	4.82	6.31
Philadelphia (country)	4.57	6.18	5.78	....	....	4.68	5.58	4.73	....	....	4.45	4.72	6.21
Baltimore (city)	4.31†	5.91	5.61	5.71	6.96	4.76	....	4.81	5.51	....	4.68	4.76	6.26
Baltimore (country)	4.21†	5.81	5.51	5.50	6.75	4.66	....	4.71	....	....	4.58	4.66	6.16
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[12]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.80	....	....	....	....	....	....	5.10	5.90	....	5.05	5.05	6.80
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	....	6.37	....	5.02[20]	....	4.97[20]	5.87	....	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	....	6.27	....	4.92[20]	....	4.87[20]	5.77	....	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	....	5.20[5]	6.00	....	4.70	5.65	4.40	5.10	6.65	4.40	4.95	6.20
Buffalo (country)	4.30	....	5.05[5]	5.55	....	4.25	5.50	4.25	4.95	6.65	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	....	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	....	4.95[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.78	7.03	4.52	5.35	4.40	5.10	6.85	4.65	4.60	6.15
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.45	....
Cincinnati	4.671	5.516[3]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.65[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.65[9]	4.25	4.45	5.90
Milwaukee	4.629	5.679[8]	5.379[8]	5.829	7.079	4.529	5.629	4.579	5.279	6.979[9]	4.579	4.779	6.229
St. Louis	4.78	5.83[9]	5.53[9]	6.02	7.27	4.68	5.82	4.73	5.47[12]	....	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	....	....	5.65	....	4.45[20]	....	4.40[20]	5.93[22]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[15]	....	....	5.18[20]	....	5.13[20]**	6.29[11]	....	5.03[20]**	5.33[20]	7.29[20]
Omaha, Nebr.	5.365	....	....	6.565	7.815	5.265	....	5.315	6.015	....	5.315	5.515	6.965
Houston, Tex.	5.50	....	....	5.50	7.70	5.25	....	5.30	6.80[12]	7.70	5.85	5.35	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[23]	9.35[16]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[3]	9.20[16]	5.20	5.40	7.50
San Francisco	5.20[21]	6.65[5]	....	6.85[5]	7.75[5]	5.75[21]	8.70[13]	5.05[21]	7.00[12]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	....	7.10[3]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	8.50[13]	5.25[17]	5.45[17]	7.55[17]
Portland, Oreg.	5.30[17]§§	....	7.10[3]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [15]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled; **add 0.40 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

(Electro Metallurgical Sales Corp. has revised prices upward on certain products, effective Dec. 6 on spot sales and Jan. 1 on contracts. Following spot prices for calcium, chromium, silicon and briquetted and certain miscellaneous alloys are nominal pending issuance of new price lists by leading sellers.)

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $47, Palmerton, Pa.; $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $153, ton lot $165, less ton $172; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%. **West Coast Prices:** Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23c, ton lot 23.6c, less ton 24.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17c, ton lot 17.6c, less ton 18.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.4c per lb of alloy, carload packed, 7.95c, ton lot 8.45c, less ton 8.95c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 17.6c per lb of contained Cr, c.l., packed 18.2c, ton lot 18.8c, less ton 19.5c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., SMxD, bulk 19.1c per lb of contained Cr, c.l., packed 19.7c, ton lot 20.4c, less ton 21.35c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 27c per lb of contained Cr, 0.04% C 26c, 0.05% C 25.5c, 0.06% C 25c, 0.10% C 24.5c, 0.15% C 24.0c, 0.20% C 23.75c, 0.50% C 23.5c, 1% C 23.0c, 2% C 22.5c. Carload packed add 0.8c, ton lot add 1.35c, less ton add 2.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, and C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 23c per lb of contained chromium, carload, packed 23.8c, ton lot 24.35c, less ton 25.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, bulk, max. 0.50% C grade, 87c per lb of contained chromium, carload packed 88c, ton lot 89.5c, less ton 91.5c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 8.8c per lb of contained Si, carload packed 10c, ton lot 10.65c, less ton 11.3c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.2c per lb of contained Si, carload packed 12.25c, ton lot 12.85c, less ton 13.45c; Central, add 0.3c for c.l. and 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 12.7c per lb of contained Si, carload packed 13.7c, ton lot 14.25c, less ton 14.8c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 14.35c per lb of contained Si, carload packed 15.35c, ton lot 15.85c, less ton 16.35c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low - Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.65c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular, 16.5c per lb of Si, c.l. packed 17.5c, ton lot 18c, less ton 18.5c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 11.1c per lb of briquet, carload packed 11.6c, ton lot 12c, less ton 12.4c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8c per lb of briquet, c. l. packed, 8.6c, ton lot 9c, less ton 9.4c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si) Eastern Zone, contract, c.l., bulk 7.65c per lb of briquet, c.l. packed 8.25c, ton lot 8.65c, less ton 9.05c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 4.65c per lb of briquet, c.l. packed 5.25c, ton lot 5.65c, less ton 6.65c. (Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 4.8c, c.l. packed 5.4c, ton lot 5.8c, less ton 6.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 16.75c per lb of alloy, carload packed 17.35c, ton lot 18.85c, less ton 19.85c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 15.5c per lb of alloy, carload packed 16.5c, ton lot 18c, less ton 19c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade (Va 50-55%,** Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.55c, ton lot 6.9c, less ton 7.25c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western, add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, ton lots. 1" x D, $1.20 per lb of alloy, freight allowed. Less ton lots $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, bulk 15.75c per lb of material, carload packed 16.5c, ton lot 17.25c, less ton 18c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%), Eastern Zone, carload, packed, 1" x D, 37c per lb of alloy, ton lot 39c, less ton 41c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 14.3c per lb of alloy, ton lot 15.05c, less ton 15.8c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Controls Over Copper Products May Be Sought

Commerce Department forecasts tight supplies and firm prices in 1948. Brass ingot prices advance

NEW YORK—At least part of the nonferrous metal industries will remain under at least partial control next year. Allocation powers over tin and tin products likely will be continued while new regulations may be issued covering copper.

COPPER — Domestic and foreign demand in 1948 for copper, copper and brass mill and wire and cable mill products likely will create a supply-demand position which may require the expansion of a series of controls, according to the *"Domestic Trade Digest,"* issued by the Department of Commerce. "Controls, however, must be designed so as to be sufficiently flexible in order to permit prompt variance to meet spot conditions," the *Digest* states. "It is quite probable that the current price for copper will hold firm in 1948. Copper buying programs by dollar-enriched countries must be safeguarded in order to forestall a recurrance of world price spirals."

BRASS AND BRONZE INGOTS — Leading producers of brass and bronze ingots advanced their prices ½ to 1-cent a pound last week due to the prevailing high prices for scrap. The advance of 1-cent applies on ingot specifications 100-132, 295-327, 400-415, 423-424, and 500 and 3/4-cent on specifications 193-257, and ½-cent on specifications 420-422. The market is now quoted 18.50c to 19.00c for ingot No. 115, 22.50c to 23.00c for No. 305, 26.50c to 27.00c for No. 215, and 14.50c to 15.40c for No. 405.

LEAD—Total stocks of lead held by smelters and refiners dropped to only 146,034 tons as of Nov. 1, the smallest since 1945 and comparing with 156,653 tons as of Oct. 1, according to the American Bureau of Metal Statistics. Stocks of refined lead declined 5750 tons to 18,467 tons while stocks of antimonial lead dropped from 10,165 tons to 9903. OMD has received from industry in the past few weeks applications for three times the quantity of lead now held by the Office of Metals Reserve. OMR stocks of lead now total only 3230 tons while those held by U. S. Commercial Co. now total 1300 tons. Undertone of the market remains firm.

ZINC — Although sales of prime western zinc were reported in the export market last week at 10.875c, fas Gulf ports, leading sellers continued to quote 10.75c on that basis. In the domestic market, prime western held at 10.50c, East St. Louis, in a tightening market. Tightness in the market is attributed in part to the transfer of 126,797 tons from OMR stocks to the government's stockpile. Stocks of zinc at smelters at the end of November totaled only 69,166 tons compared with 79,273 tons at the end of October and 195,828 tons at the end of November, 1946. Smelter production in November was at the rate of 2323 tons per day compared with 2314 tons in October, making production 69,682 tons in November and 71,745 tons in October. Domestic deliveries increased 7242 tons to 65,702 tons, the largest since March but some 10,000 tons less than in November, 1946. Export shipments increased to 10,125 tons, making total deliveries in excess of production for the first time since March.

TIN — According to trade reports, formal negotiations for a new Bolivian tin contract for 1948 started in Washington last week. The resulting price that RFC pays for Bolivian tin is expected to set the price level for 1948. Consensus in the trade is that it will be higher than the present 80-cent level.

ALUMINUM — Federated Metals Division, American Smelting & Refining Co., has announced a new aluminum casting alloy, called Tenzaloy. Nominal composition of the alloy is 0.8 per cent copper, 0.4 per cent magnesium, 8.0 per cent zinc, and the balance aluminum.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 18.50-19.00c; 88-10-2 (No. 215) 26.50-27.00c; 80-10-10 (No. 305) 22.50-23.00c; No. 1 yellow (No. 405) 14.50-15.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.50-16.00c; No. 12 foundry alloy (No. 2 grade) 15.25-15.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 15.25-16.00c; grade 2 (92-95%) 14.00-15.00c; grade 3 (90-92%) 13.50-14.50c; grade 4 (85-90%) 13.25-14.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $79-$81 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.
Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills, carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 5000 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.25, No. 2 copper 17.25, light copper 16.25, composition red brass 14.00, auto radiators 10.75, heavy yellow brass 10.00, brass pipe 11.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.75, No. 2 copper 17.75, light copper, 16.50-16.75, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50-17.00, No. 2 15.50-16.00, light copper 14.50, No. 1 composition red brass 12.00-12.50, No. 1 composition turnings 11.50, mixed brass turnings 8.00, new brass clippings nom. 12.00-12.50, No. 1 brass rod turnings 10.00-10.50, light brass 6.00-6.50, heavy yellow brass 8.25-8.50, new brass rod ends 10.50-11.00, auto radiators, unsweated 9.50-9.75, cocks and faucets 9.50-9.75, brass pipe 9.25-9.50.

Lead: Heavy 12.00, battery plates 6.75-7.00, linotype and stereotype 14.00-14.50, electrotype 11.50-12.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00-5.25; new die cast scrap 4.50-5.00, old die cast scrap 2.50-3.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S 8.50-9.00, old sheets 6.50-7.00, crankcases 6.50-7.00, borings and turnings 2.00-2.50, pistons, free of struts, 5.50-6.00.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. Average	21.50	14.825	10.50	80.00	15.00	33.00	35.00	74.625
Dec. 1-11	21.50	14.80-14.85	10.50	80.00	15.00	33.00	35.00	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electro. cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00
No. 2 Heavy Melt. Steel	40.00
No. 1 Busheling	40.00
Nos. 1, 2 and 3 Bundles	40.00
Machine Shop Turnings	35.50-36.00
Mixed Borings, Turnings	35.50-36.00
Short Shovel Turnings.	37.75-38.25
Cast Iron Borings	36.00-36.50
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Elec. Furnace Bundles.	46.50-47.00
Heavy Turnings	39.50-40.50

Cast Iron Grades

No. 1 Cupola	52.50-53.50
Charging Box Cast	43.00-44.00
Heavy Breakable Cast.	40.00-41.00
Unstripped Motor Blocks	45.00-46.00
Malleable	59.00-60.00
Brake Shoes	41.00-42.00
Clean Auto Cast	52.50-53.50
R.R. Malleable	59.00-60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.00
R.R. Malleable	59.00-60.00
Axles	49.00-50.00
Rails, Rerolling	53.50-54.00
Rails, Random Lengths	49.50-50.00
Rails, 3 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Railroad Specialties	51.50-52.50
Uncut Tires	49.00-50.00
Angles, Splice Bars	50.00-51.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.00-39.50*
No. 2 Heavy Melt. Steel	39.00-39.50*
No. 1 Busheling	39.00-39.50*
Nos. 1 & 2 Bundles	39.00-39.50*
Machine Shop Turnings	33.00-33.50
Mixed Borings, Turnings	33.00-35.00
Short Shovel Turnings.	35.00-35.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Heavy Turnings	39.00-40.00
Alloy Free Turnings	37.00-38.00
Cut Structurals	50.00-52.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	56.00-60.00
Charging Box Cast	50.00-52.00
Stove Plate	52.00-54.00
Heavy Breakable Cast.	52.00
Unstripped Motor Blocks	50.00-51.00
Malleable	67.00-70.00
Brake Shoes	50.00
Clean Auto Cast	58.00-60.00
No. 1 Wheels	52.00
Burnt Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00
R.R. Malleable	67.00-70.00
Rails, Rerolling	56.00
Rails, Random Lengths	53.00-54.00
Rails, 3 ft and under	57.00-60.00
Cast Steel	52.00-53.00
Railroad Specialties	52.00-53.00
Uncut Tires	50.00-51.00
Angles, Splice Bars	54.00-56.00

VALLEY

No. 1 Heavy Melt. Steel	39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Bundles	39.50-40.00*
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings.	35.00-35.50
Cast Iron Borings	47.00-48.00
Low Phos.	47.00-48.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00

MANSFIELD

Machine Shop Turnings	36.50-37.50
Short Shovel Turnings.	36.50-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	48.00
Charging Box Cast	40.00
Heavy Breakable Cast.	42.00
Stove Plate	40.00
Unstripped Motor Blocks	39.00
Brake Shoes	36.00
Clean Auto Cast	47.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	58.00
Rails, Rerolling	48.50
Rails, Random Lengths	46.50
Rails, 18 in. and under	51.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	29.50-30.00
Cast Iron Borings	29.50-30.00
Punchings & Plate Scrap	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Heavy Breakable Cast.	38.00-39.00
Clean Auto Cast	45.00-46.00

BUFFALO

No. 1 Heavy Melt. Steel	$41.50-43.50
No. 2 Heavy Melt. Steel	39.25-40.25
No. 1 Busheling	39.25-40.25
No. 1 & 2 Bundles	39.25-40.25
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Cast Iron Borings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Low Phos.	45.00-47.00
Elec. Furnace Bundles.	44.00-45.00

Cast Iron Grades

No. 1 Cupola	50.00-52.00
Heavy Breakable Cast.	45.00-47.00
Malleable	55.00-57.00
No. 1 Wheels	53.00-55.00
Clean Auto Cast	50.00-52.00

Railroad Scrap

Rails, 3 ft. and under.	50.00-52.00
Railroad Specialties	49.00-51.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$42.00*
No. 2 Heavy Melt. Steel	42.00*
No. 1 Busheling	42.00*
No. 1, No. 2 Bundles	42.00*
No. 3 Bundles	40.00*
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings.	35.00-36.00
Bar Crop and Plate	47.50
Punchings & Plate Scrap	47.50
Cut Structurals	47.50
Elec. Furnace Bundles.	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	39.00-40.00

* Nominal.

Cast Iron Grades

No. 1 Cupola Cast	50.00-51.00
No. 1 Machinery Cast.	52.00-54.00
Charging Box Cast	50.00-51.00
Heavy Breakable Cast.	50.00-51.00
Unstripped Motor Blocks	47.50-48.50
Malleable	60.00-62.00
Clean Auto Cast	52.00-54.00
No. 1 Wheels	52.00-53.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$33.50
No. 2 Heavy Melt. Steel	33.50
No. 1 Busheling	33.50
Nos. 1 & 2 Bundles	33.50
No. 3 Bundles	31.50
Machine Shop Turnings	27.50-29.00
Mixed Borings, Turnings	27.50-29.00
Short Shovel Turnings.	29.00-30.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles.	40.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Charging Box Cast	45.00-46.00
Heavy Breakable	44.00-45.00
Unstripped Motor Blocks	42.50-43.50
Malleable	54.00-55.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings.	28.50-29.50
Bar Crops and Plate	32.50-33.50
Punchings & Plate Scrap	32.50-33.50
Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	38.00-39.00
Stove Plate	38.00-39.00
Unstripped Motor Blocks	36.00-37.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
Nos. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Punchings	49.00-50.00
Elec. Furnace Bundles.	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	43.50-44.00

Cast Iron Grades

No. 1 Cupola Cast	53.00-58.00
Clean Auto Cast	53.00-58.00
No. 1 Wheels	47.00-49.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	68.00-69.00
Rails, Rerolling	58.00-60.00
Rails, Random Lengths	52.00-53.00
Rails, 3 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Railroad Specialties	53.00-54.00
Angles, Splice Bars	54.00-55.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$38.00-39.00
No. 2 Heavy Melt. Steel	37.00-38.00
Machine Shop Turnings	31.00-33.00
Short Shovel Turnings.	33.00-34.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	47.00-50.00
Mixed Cast	45.00-47.00
Heavy Breakable Cast.	40.00-41.00
Brake Shoes	46.00-47.00
Clean Auto Cast	48.00-49.00
Burnt Cast	45.00-46.00

Railroad Scrap

R.R. Malleable	60.00-62.00
Rails Rerolling	56.00-59.00
Rails, Random Lengths	50.00-52.00
Rails, 3 ft and under	54.00-55.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-49.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	30.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	37.50-38.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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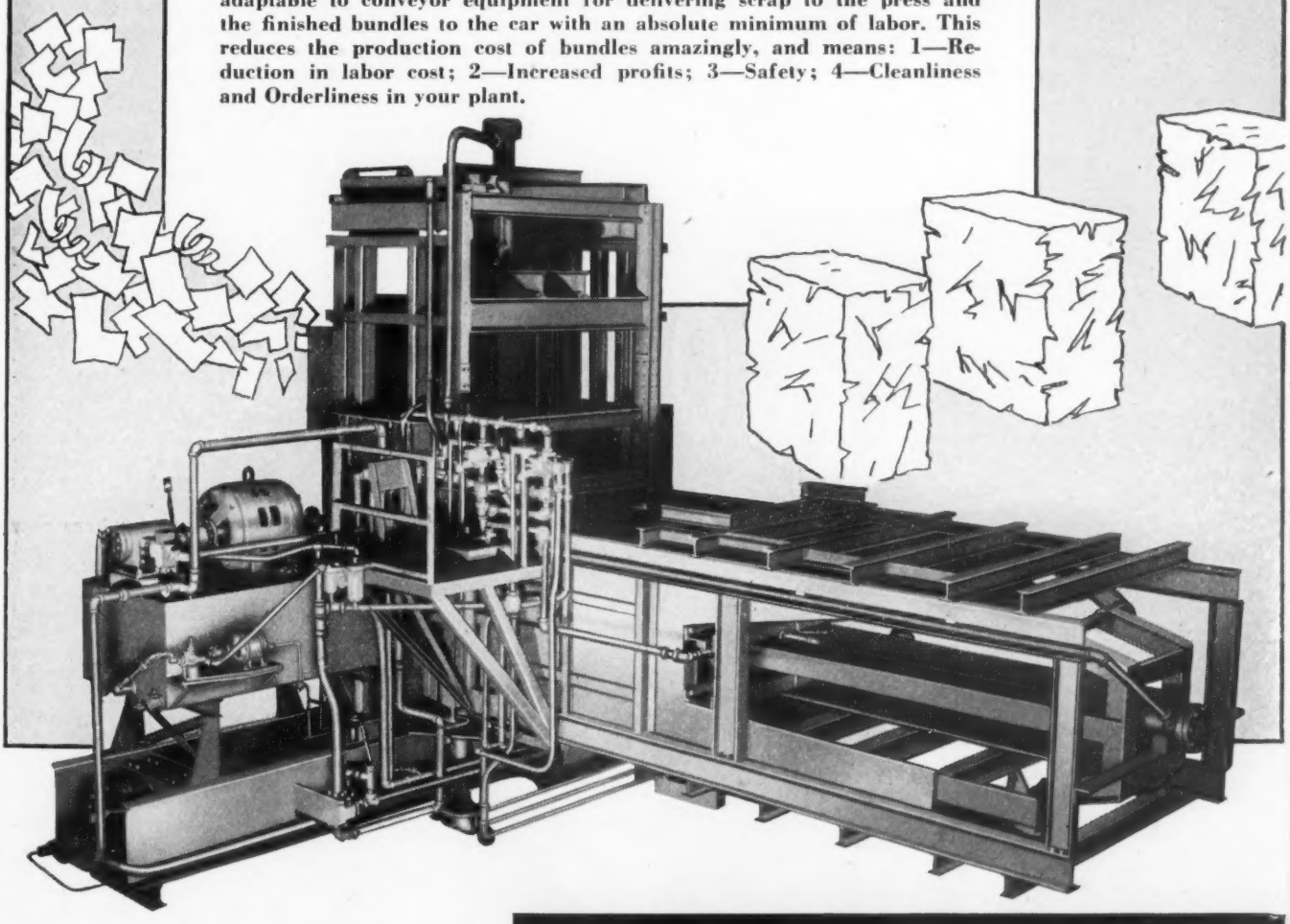
The Harris 4-A Baler is outstanding in its design. Every consideration is given toward lower initial and installation cost, as well as maintenance and operation. The following features are typical examples of the greater profit thought injected into the design of the Harris baler:

1. **The vertically operating tramper door which means continuous operation in that a charge can be loaded while a bundle is being compressed.**
2. **The Harris 4-A baler is equipped throughout with micromatic honed cylinders which means perfect concentricity and extremely close tolerances. This greatly increases the life of all packings as well as the life of the machine itself and gives a smooth operation.**
3. **The Harris 4-A baler is equipped with Vickers vane type rotary pumps and outstanding control arrangement.**

The Harris 4-A baler located adjacent to your railroad siding is easily adaptable to conveyor equipment for delivering scrap to the press and the finished bundles to the car with an absolute minimum of labor. This reduces the production cost of bundles amazingly, and means: 1—Reduction in labor cost; 2—Increased profits; 3—Safety; 4—Cleanliness and Orderliness in your plant.

Increase Profits



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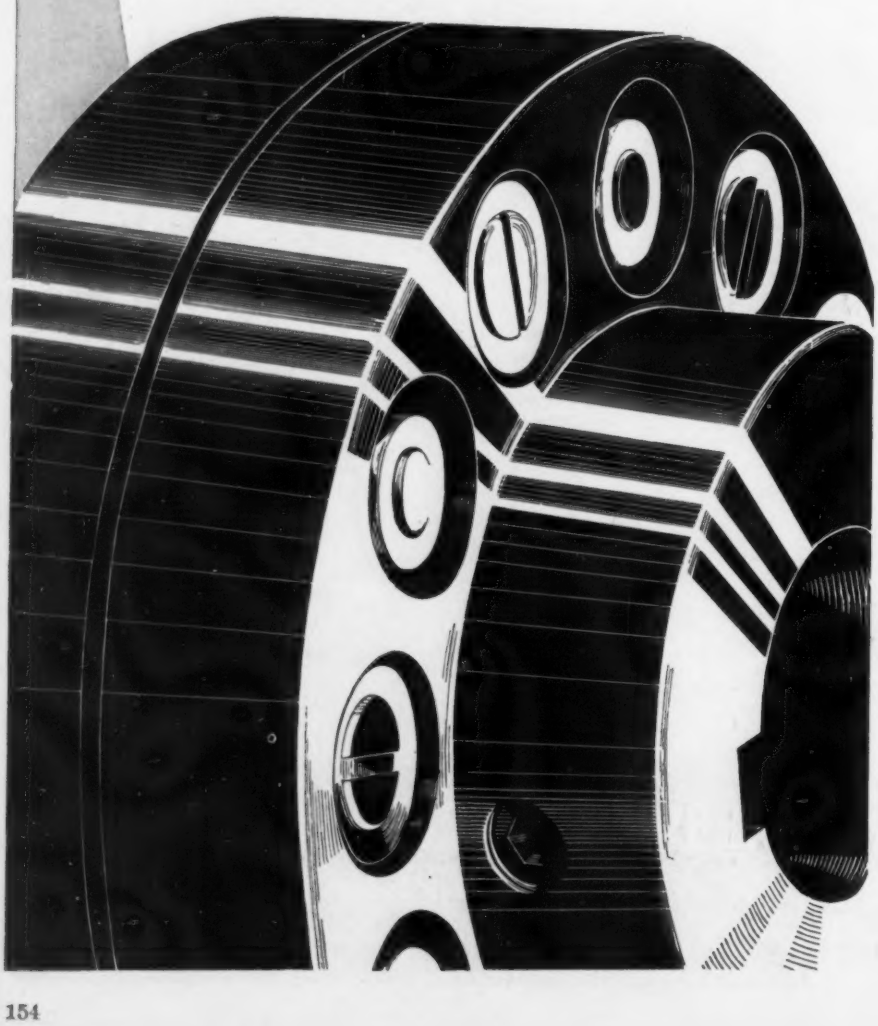

Sheets, Strip . . .

Cold-rolled strip extras revised upward by most producers $3 a ton

Sheet Prices, Page 146

Boston — Most, but not all, producers of cold-rolled alloy strip have revised extras representing an average advance of around $3 a ton; further adjustments are likely in finer sizes of alloy cold strip flattened from round wire, 5/16-inch and narrower. Hot-rolled in this grade has been advanced, also special shapes, and another bracket in the extra list covering this finer strip may be added.

With first quarter schedules filled, cold-rolled producers are increasingly concerned with hot-rolled outlook, notably low carbon. Allocations have been reduced in some cases and potential supply may not eventually match cold reduction schedules. At least some revisions appear to be unavoidable. Limited orders for cold strip specialties are being taken for second quarter. Due to absence of buying by the automobile industry, stainless strip is slower and some deliveries have improved to four and five weeks. With the exception of stainless, all grades of sheets are in limited supply, notably hot-rolled, silicon and enameling; stove and range builders clamor for more of the latter. Fuel oil suppliers are becoming restrictive in the acceptance of new customers; this may affect demand for 275-gallon household tanks fabricated from No. 12 gage carbon sheets normally, but of late built of higher cost substitutes, aluminum and even floor plate.

New York — Demand for sheets, especially hot and cold-rolled and galvanized, continues well in excess of supply. Only in stainless steel and some specialties is it possible for consumers to place tonnage for shipment within the first quarter. In fact, stainless sheets can be had for delivery within six to seven weeks. Increased capacity may make itself felt to some degree as the first quarter advances, but it appears that such possible expansion as may develop has already been discounted.

Philadelphia — Except where new capacity is being brought in, sheet sellers generally are unable to supply any more new tonnage against next quarter's consumer quotas, and some are not in position to supply as much. Stainless is one of the few items on which fairly good delivery can be made.

Pittsburgh — No easing in pressure for flat-rolled steel deliveries is anticipated for months to come, with supply not expected to be in balance with demand until late 1948 at earliest. However, some gradual easing in present tight supply in sheets and strip is indicated throughout next year, providing the Marshall Plan does not result in too excessive a drain on available semifinished steel supply. Inadequate supply and comparatively poor quality of basic raw materials is expected to restrict overall supply of ingots for conversion into many finished steel items next year. This situation may possibly offset the new cold-reduction finishing mill capacity scheduled to be placed in operation during the year. Some sell-

ers are considering revising narrow strip pickling extras early in 1948, in line with upward adjustments made by other interests earlier this year.

Cincinnati—Prospective carryover, ranging up to six weeks, of district sheet mills precludes any increase in first quarter allotments. Full effect of the car program and export directives have not yet been evaluated. Some increase in output of electrical sheets has been announced, with corresponding decrease in some other grades.

Chicago — Consumers of sheets and strip are pushing for quicker and larger shipments of sheets and strip, although prospects for both are virtually nil. Users suffered from the leveling off of unshipped tonnage in fourth quarter and the establishment of somewhat smaller quotas for 1948. Fact that railroads will be given larger tonnages of steel next year means that other users will get less. There seems to be little fear that general allocation of steel will be re-instituted, but concern is expressed over what operation of the Marshall plan may mean to steel supply next year.

St. Louis — Books for sheet steel rollings in February and March were opened last week by Granite City Steel Co. and attempts will be made to hold allocations on a quarterly basis in 1948. By Jan. 15 the mill expects to be current on all orders, except cold-rolled sheets, for the first time since the war. On that date, the company will go out of the hot sheet and plate business. Operation of the new $7 million cold rolling mill was postponed another week due to adjustment difficulties. It is on full production of this that the 1948 order carryover hinges. Sheet demand is unremitting but customers have eased their pressure somewhat.

Plates . . .

Plate Prices, Page 147

Birmingham — Plates are a major concern for many fabricators in this territory. Mill schedules continue heavy, but supplies are being augmented in scattered purchases wherever users can find a few tons to piece out schedules. A main worry is that the new year probably will see an even tighter situation with allocation of an undisclosed tonnage for the district's new tube mill.

Pittsburgh — Some producers state the 15 per cent increase in monthly steel requirements for railroad maintenance and construction program next quarter will necessitate further revision in first quarter production schedules. Despite fact some improvement in plate output is indicated early next year, warehouse interests, tank and heavy machinery fabricators probably will get less steel next quarter because of the railroad freight car program. It is estimated plates represent nearly 50 per cent of the steel requirements for this program. Producers will have sizable carryover tonnages by yearend.

Philadelphia — Eastern plate mills are virtually out of the market on tank plate and flange steel, allotments having been made for the first quarter and producers generally refusing to quote beyond. Their schedules on specialties, including floor plate, also are well covered.

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Steel Bars . . .

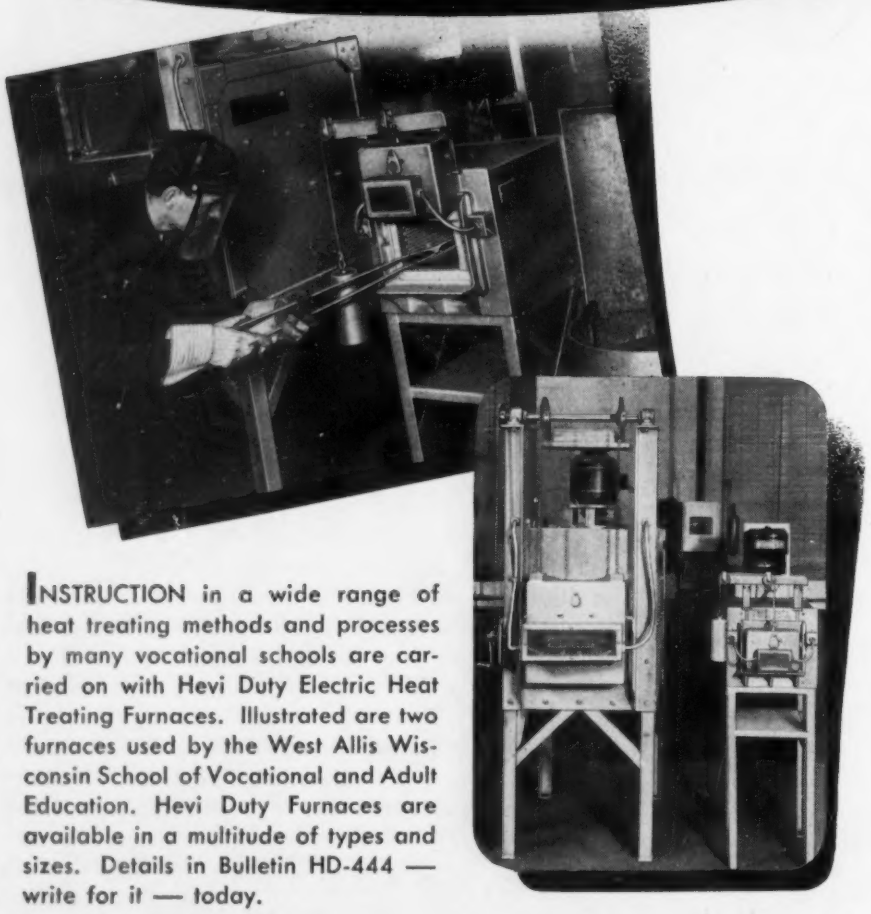
Bar Prices, Page 146

Philadelphia — Hot-rolled carbon bars continue in well diversified demand, although mills have filled up their schedules for the first quarter. Meanwhile, most producers are making headway on arrearages, with some expected to be current by the end of January. Cold-drawn carbon bars are still available for shipment within the next three months; alloys, within the next five to six weeks.

Boston — Warehouse inventories of carbon bars in small sizes are in better balance while pressure has increased for larger sizes; this reverses a situation prevalent six months ago, but does not hold generally with manufacturing consumers. The latter are still in need of small sizes. Demand for alloys is slightly heavier. Revised extras are more general. Stock of cold-finished carbon bars are generally sufficient. Demand for both small and large forgings is up with some shops working a higher ratio of alloys than before the war. Bolt and nut shops as a rule have been less successful than most in balancing inventories, partly because of the wide range of sizes and grades required.

New York — One leading hot carbon bar seller expects to have his order book within reasonable balance by Feb. 1. In other words, this seller believes he will be little behind on tonnage scheduled for delivery by that time. Other producers are making progress on arrearages, although some doubt if they will be completely caught up before late in the first quarter and express even greater doubt with regard to shipments in some of the very small sizes.

VOCATIONAL SCHOOLS AND HEVI DUTY FURNACES



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MILWAUKEE 1, WISCONSIN

Wire . . .

Wire Prices, Page 147

Boston — Until recently pressure for automotive wire had been heavy, but in ratio to other steel products, inventories now are sufficient to result in delivery suspensions of this grade. In other directions demand is maintained with most first quarter schedules filled. Pressure for clock spring wire has held up beyond expectations. Low carbon grades are in a more stringent position than high carbon. Raw material and semifinished steel supply is causing concern as to whether first quarter commitments can be met. Production of drawn wire this year will approximate 2,640,000 tons compared with 1,933,124 tons in 1946. Nail output is estimated at 811,000 tons against 636,632 tons last year.

Birmingham — The scarcity of wire continues. Demand, in some specifications, has tapered off largely because of weather conditions which have slowed outside agricultural work. Processors' wire, however, is not in sufficient supply to meet production schedules in some of the smaller industries. No definite indication of a better supply situation is in early prospect.

Pittsburgh — Despite some moderate improvement in wire output this quarter, most sellers do not anticipate any easing in pressure for prompt shipments in near future. Until huge pent-up demand is met, most producers do not expect that shipping schedules and new bookings will revert to prewar pattern, influenced by seasonal requirements. Demand-supply relationship in nails has become further unbalanced recently, while the outlook in supply is not encouraging with indicated sharp upturn in housing construction, requiring about 850,000 tons of nails next year. Mill production emphasis is on plain wire requiring minimum amount of handling and processing.

Chicago — Pressure for nails is growing more acute. Consumers want to receive shipments of their first quarter allotments as quickly as possible after the turn of the year to build inventories in preparation for the anticipated heavy demand in the building trades next spring. Requirements for spring cushion wire are considerable, but supply of oil-tempered wire seems adequate. Inventories of wire rope and electrical building wire are growing.

Rails, Cars . . .

Track Material Prices, Page 147

New York — Domestic freight car awards in November amounted to 8169, and brought the total for the year up to 117,452 cars, according to the American Railway Car Institute. Of last month's total, 6969 went to commercial shops and 1200 to railroad shops.

Unfilled orders as of Dec. 1 amounted to 125,395, of which 94,069 were

on order with the commercial shops and 31,326 with the railroad shops. The Institute also announced a revision in the number of domestic freight cars produced in November from 8928, as noted in last week's issue, to 8938.

Pittsburgh — Steel industry has agreed to ship 241,000 tons of steel a month to meet the revised freight carbuilding program through first quarter next year only, because of the prospect that new demands on both carbuilders and steel producers may develop out of the Marshall Plan. Increase of 31,000 tons in the monthly steel requirements for the freight car program is largely for maintenance.

Structural Shapes . . .

Structural Shape Prices, Page 147

Birmingham — Despite improvement in some scattered sections, shape demand is still spotty. Most of the activity is at the drawing board and costs still are playing a major role in decisions to defer construction or materially trim original plans.

Seattle — Fabricators have fair backlogs but they could use twice as much steel as is currently available. Prospects for the first quarter are less promising as mills have reduced allocations. Plants hesitate to take contracts calling for materials in excess of what is available.

Philadelphia — Bridge work dominates the structural market, including those of the Chesapeake & Delaware Canal, Chesapeake City, Md.; Delaware Memorial Bridge, near Wilmington, Del., requiring eventually 51,650 tons of miscellaneous steel, plus 54,000 feet of suspension rope; and the Penrose Avenue Bridge, Philadelphia, requiring around 18,000 tons of miscellaneous steel. Supply of shapes is tightening with a 48-inch mill at Bethlehem, Pa., suspending operations before the holidays to carry out a repair program which will require possibly four weeks.

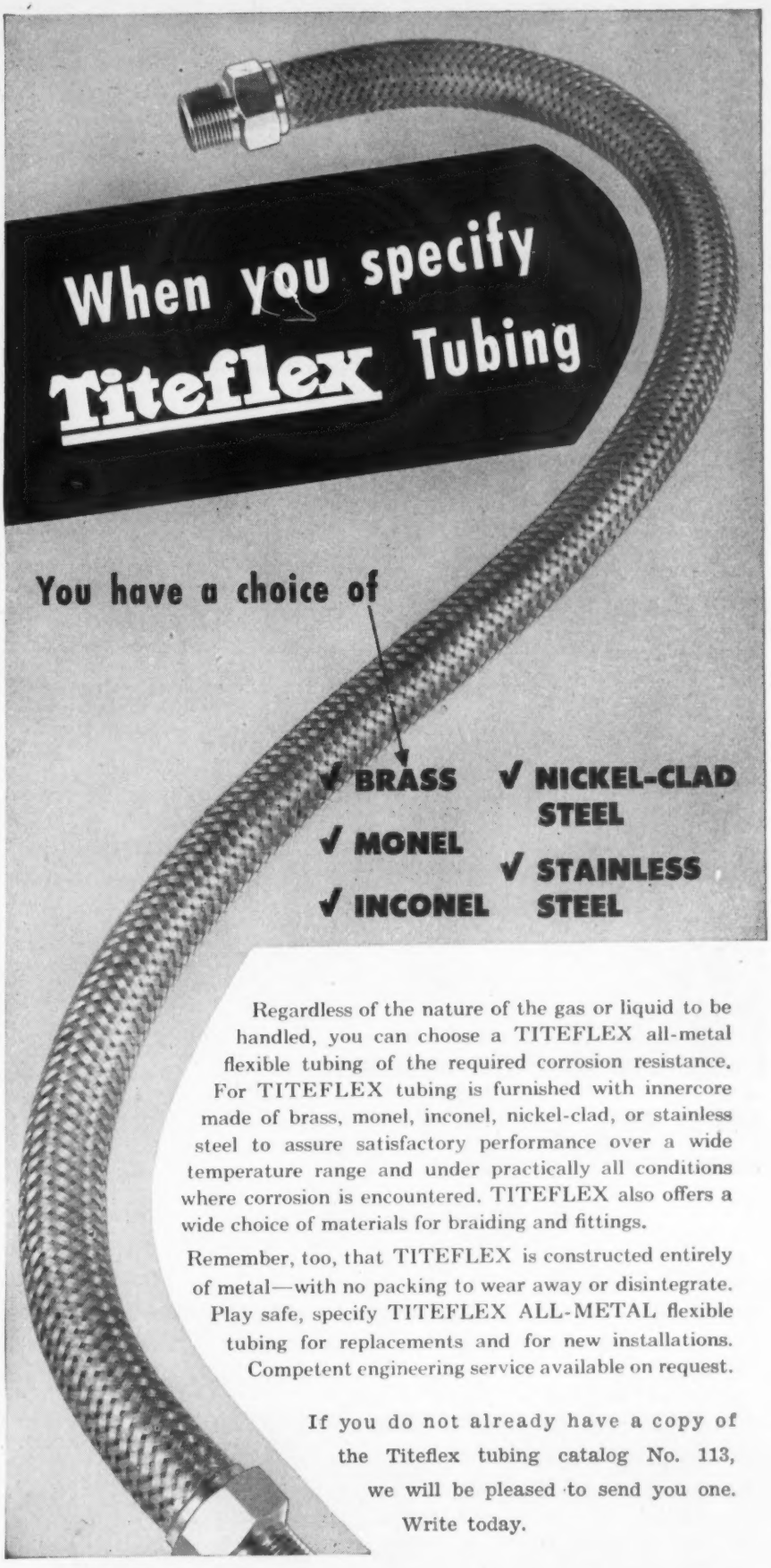
Boston — Relatively little shop work is required for 19 state bridges, Maine, closing this week and taking an aggregate of 1110 tons. Bids call for the delivery only of 670 tons while 340 tons are to be furnished and erected for three bridges. This is the first sizable bridge inquiry for delivery next year; highway programs for other district states are uncertain. Private construction inquiry has slackened at the yearend. While tonnage of plain material has not measurably improved, mills are getting into a more current position on commitments.

New York—While orders are rather spotty, considerable structural inquiry is pending. Possibly the largest single project involves 6600 tons for a veterans hospital in northern New Jersey.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

Philadelphia — Reinforcing bar market is featured by requirements of several bridges, including 1725 tons for the Delaware Memorial bridge, near Wilmington, Del., which will eventually require 5275 tons; 560 tons for Penrose Ave. bridge, Philadelphia, plus an additional 1220 at a later date.



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Tubular Goods . . .

Tubular Goods Prices, Page 147

Youngstown, O. — Youngstown Sheet & Tube Co. sent its first shipment of pipe by air last week.

A C-54 Army cargo plane took off from Youngstown Municipal airport Dec. 9 with more than eight tons of conduit needed to complete work on a military project at Keesler Field, Miss. Pipe loaded at the company's plant here before dawn was transferred to the plane two hours later and before dusk was scheduled to arrive at the southern air field. More than 300 pieces of 10-foot lengths of two and three-inch heavy wall conduit were in the shipment.

Tin Mill Product Prices Rise $19 a ton Jan. 1

Pittsburgh—Carnegie-Illinois Steel Corp. will raise tin mill product prices 85 cents to $1.20 per base box, effective Jan. 1. Increases are a result of substantial increases to the company during 1947 in wages, transportation charges, and the cost of scrap, pig tin, palm oil, coal and other purchased goods and services, according to the price announcement. Unlike most other steel products, there has been no change in the selling price of tin mill products since December, 1946.

Carnegie-Illinois' prices, per base box of 100 pound weight at Pittsburgh and Gary, Ind., plus applicable switching or transportation charges in effect at time of shipment are as follows:

	1948	1947
Electrolytic Tin Plate		
0.25 lb coating	$5.80	$4.85
0.50 lb coating	6.00	5.05
0.75 lb coating	6.20	5.25
Hot-Dipped Tin Plate		
Cokes, 1.25 lb	6.60	5.75
Cokes, 1.50 lb	6.80	5.75
Best Cokes	7.10	6.00
Kanners Special	7.30	6.20
Silver Tin	8.25	7.05
Black Plate (Canmaking Quality)		
Regular		
55 to 70 lb, incl.	5.20	4.20
75 to 95 lb, incl.	5.10	4.10
100 to 128 lb, incl.	5.20	4.20
Bonderized		
60 and 70 lb	5.70	4.70
75 to 95 lb, incl.	5.60	4.60
100 to 128 lb, incl.	5.70	4.70
Phosphoric Treatment		
55 to 70 lb, incl.	5.35	4.35
75 to 95 lb, incl.	5.25	4.25
100 to 128 lb, incl.	5.35	4.35
Terne Plates		
Mfg. Ternes	6.20*	5.40*
Special Coated Mfg. Ternes	5.90*	5.40*

* 100 lb basis.

All sales are subject to the seller's list of extras and deduction and standard conditions of sales in effect at time of shipment.

Prior to this announcement, Carnegie-Illinois had in effect a single price for both 1.50 lb and 1.25 lb coating weights. This price was determined by averaging the comparatively small quantity of tin plate produced carrying 1.50 lb coating with the much larger quantity produced carrying 1.25 lb coating. This is the first time a special price has been named for 1.25 lb coating now almost universally used in accordance with government directives where hot-dipped coke tin plate is required.

In addition to the above price revisions it should be noted that all black plate, 38 to 29 gage, will be sold on an area basis as can making quality black plate. The lone exception is holloware enameling black plate in gages 29 to 31 inclusive, which will be quoted at $4.75 per 100 pounds for the 29 gage base, or $9 per ton above the present base of $3.90, plus the extra of 40 cents per 100 pounds for enameling stock finish. The holloware enameling plate price of $4.75 will be subject to change without notice unlike the prices quoted for tin plate, which will be applicable for 1948.

For tin plate items ordered packed in less than the customary number of sheets per package, 30 cents per base box will be charged, compared with 10 cents now in effect. Reference to "tissue packing" in the tin plate extra card will be changed as follows: "We recommend that all charcoal plates of 2A grade and better be tissue paper packed at an extra of 50 cents per package of 56 sheets, or $1 per package of 112 sheets." Formerly these charges were 8 and 15 cents, respectively. All reference for tin or terne lining in the extra card has been deleted, for this applies on exports only.

Tin Plate . . .

Tin Plate Prices, Page 147

New York—American Can Co. will boost prices of all types of cans it produces, effective Jan. 1. The higher can prices will be announced as soon as computations of labor differentials and tin plate prices are made, ac-

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cording to D. W. Figgis, president.

Birmingham — Tennessee Coal, Iron & Railroad Co. has announced, effective Jan. 1 and applicable for the entire year of 1948, increases in tin mill products. New base prices on a Birmingham base are 10 points, as usual, above those quoted by Carnegie-Illinois Steel Corp. on a Pittsburgh base.

American Can To Raise Prices, Effective Jan. 1

New York—American Can Co. will boost prices of all types of cans it produces, effective Jan. 1. The higher can prices will be announced as soon as computations of labor differentials and tin plate prices are made, according to D. W. Figgis, president.

Pig Iron . . .

Pig Iron Prices, Page 148

Buffalo—Further tightness gripped the pig iron market last week as two producers plan to curtail operations soon. One merchant stack will be withdrawn from the active list for relining after 4 1/2 years of continuous service. An ingot producer plans to shut down a basic stack for about two weeks for a fast repair job. Pig iron likely will be shipped in to maintain open-hearth operations. With increased quantities of iron moving into ingot channels and inferior quality of coke tending to reduce iron output, December allocations to foundries were the smallest since prewar days. Inventory closing this month may make more coke available for those melters that maintain operations during the yearend period.

Philadelphia — Due to shortage of pig iron, various foundries plan to close down for the holiday season. However, some improvement in supply is afforded by the resumption of operations at the larger of two stacks at Swedeland, Pa., which has been down for repairs since early October. Shipments to the trade probably will start before the end of this week. Meanwhile, reports continue concerning possible repairs and resumption of operations at the government-owned furnace at Chester, Pa. Some reports have had the Kaiser interests as negotiating, but the most consistent relate to the Phoenix-Apollo Steel Co. While some boilers and other equipment would have to be installed, the chief difficulty is the matter of coke supply.

Lukens Steel Co., Coatesville, Pa., has received 2700 tons and Worth Steel Co., Claymont, Del., has received most of its share of 2200 tons of pig iron from Norway under an exchange agreement involving plates and iron.

Pittsburgh — Pig iron shortage is expected to become more acute over coming months, due to necessity of relining some blast furnaces, and continued scarcity and poor quality of coke and scrap. Indicative of the former situation, Carnegie-Illinois Steel Corp. blew out its No. 1 furnace at the Ohio Works Dec. 8 for patching. An offsetting factor in regard to the pessimistic pig iron outlook is that gray iron foundries are making considerable inroads into order backlogs.

Boston — Although relatively small, merchant iron tonnage lost to this area by withdrawal of Tonawanda volume cannot be immediately replaced. Supply now has narrowed closer to Everett production which includes no basic. A few cars are coming in from eastern Pennsylvania, but shipments from Buffalo are restricted with indications relief for upstate New York melters will be provided before more tonnage is sent to New England.

Chicago — Although blast furnaces in this district are operating at maximum capacity, amount of pig iron available to foundries is insufficient to maintain operations at the level desired.

Ferroalloy Base Prices And Differentials Raised

New York — Electro Metallurgical Sales Corp. announced some changes last week in their price schedule, affecting principally alloys of silicon and chromium. Current differentials were also changed on packed materials as compared to bulk prices, as well as those differentials which prevail on various specified quantities. These revised prices will become effective Jan. 1, 1948, for contract users, and apply immediately on a spot basis.

The new base price (contract, carload, lump, bulk) for 50 per cent

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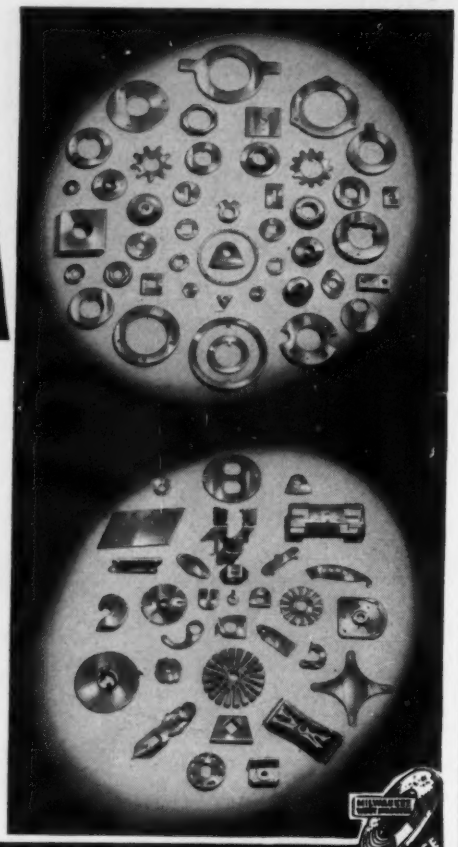

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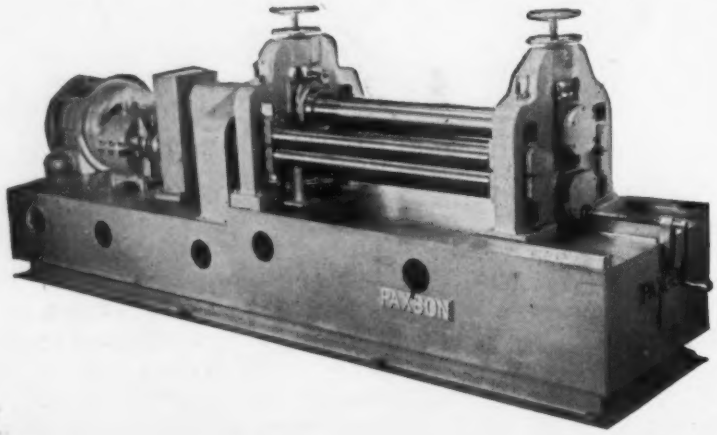

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ferrosilicon is 9.3c per pound of contained silicon, an increase of 0.5 cent per pound. Increases in other silicon alloys are as follows: Low-aluminum 65 per cent ferrosilicon, from 11.55c to 12.10c; 75 per cent ferrosilicon, from 11.2c to 11.8c; 85 per cent ferrosilicon, from 12.7c to 13.3c. Corresponding increases apply to the low-aluminum grades of 50 per cent, 75 per cent and 85 per cent ferrosilicon. New prices for 90 per cent ferrosilicon are 15.00c per pound of contained silicon for the regular grade and 15.7c for the low-aluminum grade. Silicon metal prices are increased 0.8 cent per pound. All prices are per pound of silicon contained in the alloy. The finely ground sizes (65 Mesh x Down and 100 Mesh x Down) of 15 per cent ferrosilicon are raised $10 per gross ton.

All grades of high-carbon ferrochrome, including "SM" and "Foundry" ferrochrome, are raised 1 cent per pound of contained chromium. This makes the new base price for regular high-chrome 18.6c. All grades of low-carbon ferrochrome are raised 1.5 cents per pound of contained chromium, except the maximum 2 per cent carbon grade which is up 1.75 cents, and the SM grade which is up 2 cents.

The two grades of silicomanganese are increased 0.4 cent per pound of material making a new base price of 7.8c per pound for the maximum 1.50 per cent carbon grade.

New prices for the briquetted alloys are as follows: For silicon briquets, 5.10c per pound for the large size and 5.25c per pound for the small size; chromium briquets, 12.5c per pound; ferromanganese briquets, 8.7c per pound; silicomanganese briquets 8.75c per pound.

Revised prices were also announced for some miscellaneous alloys, including the following: "SMZ" alloy, 15.00c per pound; "Silcaz" alloy, 39.00c per pound; "CMSZ" mixtures, 16.50c per pound; calcium-silicon, 16.25c per pound; and calcium-manganese-silicon, 17.5c per pound.

All prices are contract prices in the Eastern Zone for carload lots in bulk, or packed prices where shipment cannot be made in bulk.

No base-price changes apply to calcium metal or to the vanadium, tungsten, zirconium, columbium, and titanium alloys.

While no revisions are being made in the sizing, zone, or spot differentials, it has been necessary to increase packing differentials by about $4 a net ton because of considerably higher packing costs. This has also made it necessary to charge a premium for packages smaller than the standard containers of 500-pound capacity or larger. The premiums will be about 0.5 cents a pound of material for packages between 250 and 500 pounds net weight, and 1 cent a pound under 250 pounds. For briquets packaged in smaller than the standard 250-pound burlap bag, a premium of 0.25 cent a pound will apply.

Because freight and handling costs on small shipments have increased out of all proportion, the premium between carload and ton-lot shipments has been increased by about 0.4 cent a pound of material, and the premium between ton-lot and less-ton-lot shipments by about 0.5 cent a pound.

Huge Shipment of Scrap From China due in January

New York — First shipment of a lot of 1 million tons of unprepared scrap, purchased by Bethlehem Steel Co., Bethlehem, Pa., from the Chinese government is scheduled to arrive in January at Baltimore, where it will be processed by the Patatsco Scrap Corp., a Bethlehem subsidiary. This is reportedly the largest such purchase ever made by the company. The scrap will cost Bethlehem $30 million, including $18 million, it is understood, for transportation. The scrap is a portion of at least 2 million tons of war surplus which the United States turned over to China in settlement of a war debt of $174 million. It is reported that 100 ship loads will be brought in within the next 18 months.

Scrap . . .

Scrap Prices, Page 152

Pittsburgh — Little activity, pricewise, is expected in the scrap market until after the first of the year, when the first real test of steel producers' efforts to establish a voluntary price ceiling of 100 per cent OPA prices will probably come. Some producers report purchases of small tonnages of heavy melting steel scrap at the $40 level, and other scrap items are moving in relatively small volume at last week's reported prices.

Philadelphia — While the edge is off the market on steelmaking scrap, with the major open-hearth grades nominally at $42, delivered, there is little to really test the situation which remains stalemated. One large eastern Pennsylvania consumer recently canceled all tonnage overdue on contracts, offering no more than $38.50 on new tonnage. Other mills in the district have not yet taken such action, with little yet to be shipped against existing contracts. Consumers' chances of getting the market down to a more reasonable level would be better if it were at the end of the winter season instead of at the beginning when inventories should be higher than they are.

Machine shop turnings, mixed borings and turnings and similar grades are moving at unchanged prices. Short shovel turnings, punchings and plate scrap and cut structurals, however, are easier at $47.50, delivered. Cast grades continue strong, although unchanged except for unstripped motor blocks which are slightly higher at $47.50 to $48.50.

New York—With old mill contracts virtually cleaned up, brokers here have reduced their buying prices on principal steelmaking grades to $33.50, fob shipping point. This is largely a nominal price as little tonnage is being picked up at that figure. Machine shop turnings and mixed borings and turnings are off to a spread of $27.50 to $29 and short shovel turnings $29 to $30. Low phos grades are nominally unchanged at $40. Although there is weakness in steel scrap, cast iron grades are stronger with brokers offering $45 to $46, fob shipping point, for No. 1 cupola cast and charging box cast, $44 to $45 for heavy breakable and $42.50 to $43.50 for unstripped motor blocks.

Boston — Scrap consumers and yards are far apart on prices for heavy melting steel with the former offering around $31.50, shipping point, and the latter reluctant to move scrap costing that much. Tonnage being shipped is therefore small and the market still awaits a real test.

With the view of establishing a commodity rate which will move the traffic, freight on steel scrap, St. Albans, Vt., to Worcester, Mass., has been reduced to $3.85 a gross ton from $5.40.

Chicago — Although trading activity in steelmaking scrap is light, the $39 mill-offering price is not attracting sellers, a strong tone prevails. Mills, however, have the best inventories in several years and are not pressing for additional tonnage yet, although a test is likely soon.

Detroit — Scrap prices are holding firm and some tonnage is moving to local mills at prevailing locations. December production schedules of several automobile plants indicate a sharp decline in the amount of scrap to be shipped, in some cases being off as much as 50 per cent from November.

Buffalo — Strength dominates the scrap market despite absence of tonnage sales. Leading mills still refuse to bid above $39.25 a ton for No. 2 heavy melting and bundles. Possibility of dealers recognizing the mills' bid appeared remote at this time as limited sales were reported to buyers in other areas at prices $2 to $3 higher than the prevailing range of $39.25-$40.25 for No. 2 material here. Dealers also were reported paying $40.50

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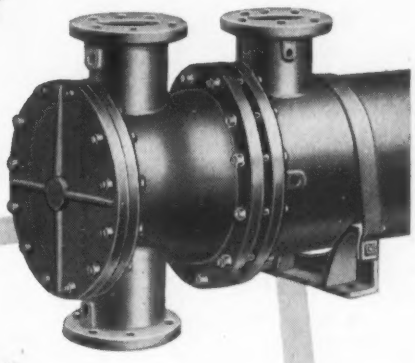

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for No. 2 heavy melting to cover previous sales.

Cast scrap remains strong. Fresh sales lifted No. 1 cupola $2 a ton to a range of $50 to $52. A carload of clean auto cast changed hands at $52 a ton. Stiffening prices in specialties were supported also by report that railroad malleable brought $70 in a recent list.

Metalworking Companies Seeking Sheet Capacity

(*Continued from Page* 60)

are reported actively seeking to engage in the steel business, nothing definite on any of these has yet been unearthed. One interest is reported seeking to lease a plant in northern Ohio which will be converted to steel rolling. Recently it was reliably reported a large holding company for a diversified list of manufacturing units was seeking to acquire a substantial interest in a medium-sized western Pennsylvania integrated steel producing company with a view to assuring itself a source of steel supply.

Entry of Portsmouth Steel Corp., Portsmouth, O., into the sheet business is scheduled for around next Apr. 1.

In making this move to relieve the critical shortage of hot-rolled sheets, Portsmouth has purchased a mechanized-noncontinuous sheet mill for $275,000 and will move it from the Algoma Steel Corp. Ltd. plant, Sault Ste. Marie, Ont. The mill was bought from the Corporacion de Fomento de La Produccion Co. which had bought the entire steel plant of Algoma for $739,000. The sheet mill has an annual capacity of 100,000 tons.

By installing the equipment, Portsmouth, associated with Kraiser-Frazer Corp., will supplement the sheets the latter obtains from Wheeling Steel Corp.

After the critical shortage of hot-rolled sheets has been relieved, the mill will be devoted to production of carbon and alloy sheet specialties. The mill also will provide the foundation for a continuous strip mill that can be installed later.

Entry of Portsmouth Steel into the sheet business will be with much the same type of equipment that was discarded at the plant in 1939.

Every Mill Suspect — In view of the high interest of manufacturing industry in acquiring steel mill properties, it is not surprising that practically every small, nonintegrated steel producing plant now in operation is suspect as a likely prospect for purchase. However, an officer of an Ohio company, Reeves Steel &

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Mfg. Co., Dover, O., last week denied his firm was in any such negotiations.

Since there are only a few nonintegrated steel mills still operating most manufacturers seeking to turn out their own sheets would have to set up new mills. Here they would encounter difficulty in obtaining new equipment since the mill equipment builders are booked far into the future. There may be considerable secondhand equipment available, however. The question of sheet bar supply would provide a hazard to be jumped, though it is said substantial tonnages can be obtained though scrap conversion deals.

Congressional Action On Controls Deferred

(*Continued from Page* 60)

Judiciary Committee last week. Mr. Harriman earlier had appeared before the Joint Committee on the Economic Report and the House Banking and Currency Committee.

In recommending legislative authority for rationing and allocations Mr. Harriman said he did not contemplate that anything approaching the comprehensive system of controls over materials, products and productive facilities, such as was in effect during the war, would be necessary at this time. He reiterated a belief that adequate authority to carry out "restricted priority, limitation on use, and inventory controls are necessary."

Plans Industry Conferences—Controls would be imposed only after careful consideration by the government and after consultation with industry, consumer and labor groups affected.

Taking cognizance of industry's proposals that voluntary allocations be made for needed programs through industry-government cooperation, Mr. Harriman said he anticipated that "the co-operation of the industries involved can be obtained to a large measure in solving the problems at hand, but mandatory powers are needed to bring uncooperative producers into the programs."

Priority powers are required chiefly in order to have the legal right to direct materials to certain end uses which are determined to be critical, Mr. Harriman averred.

"In the case of iron and steel, I am convinced there is a need to have power to channel a small part of the production to the most essential programs, by means of priorities and set-asides, and to restrict the amounts going to less essential uses.

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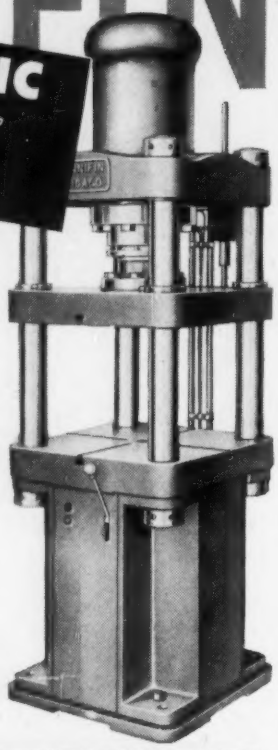
HANNIFIN

HYDRAULIC *column type* PRESSES



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to save you TIME and MONEY

Hannifin column type hydraulic presses are adapted to a wide variety of forming, assembling, pressing, and similar operations requiring fast, accurate production with smooth application of pressure. 48 standard models to choose from . . . 8 different capacities from 6 to 150 tons . . . table sizes to meet your needs and operating speeds for every purpose.

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Hannifin has played an important role in developing the hydraulic press as a modern production tool. In addition to 2- and 4-column presses, Hannifin also builds a complete line of standardized open gap hydraulic forcing and straightening presses, as well as specially designed presses for many production operations. For information ask for a copy of new Bulletin 130-T.

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Nationwide Sales and Service

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800 OUTSIDE ROOMS ALL WITH PRIVATE BATH . . . SINGLE FROM $3.00 . . . DOUBLE FROM $4.50

Charles H. Lott, General Manager

We are not suggesting, however, authority to return to the overall allocation and programming of iron and steel or the complete control over the production of iron and steel which were used during the war."

Inventory Limitations Suggested—Mr. Harriman said authority to control inventories of scarce materials which basically affect industrial production or the cost of living would be of considerable value in the anti-inflation program. Such controls, he explained, would help prevent speculative hoarding and help increase overall production by equalizing the supply of materials.

While Mr. Harriman's testimony before the judiciary group was the closest approach yet made to spelling out the control legislation desired by the administration, Republican members of Congress declared they were not satisfied as to the extent the powers would be applied and called the administration proposals requests for "blanket authority."

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1090 tons, Green River power station, Carrollton, Ky., for Kentucky Utilities Co., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

910 tons, bridge over highway 51, for U. S. Engineer, Tulsa, Okla., to Virginia Bridge Co., Roanoke, Va.; J. A. Raines, contractor.

700 tons, telephone exchange addition, East 56th St., Manhattan, New York, to American Bridge Co., Pittsburgh.

700 tons, elementary and high school, Board of Education, Chicago, to American Bridge Co., Pittsburgh.

500 tons, E. J. Frankel apartment, Merion, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, plant addition, Sloan & Blabon Corp., Philadelphia, through Walter Kidde, New York, to American Bridge Co., Pittsburgh.

500 tons, fabricating plant, Chicago Bridge & Iron Co., Salt Lake City, Utah, to Consolidated Steel Corp. Ltd., Los Angeles.

450 tons, building, Victor Animatograph Corp., Davenport, Iowa, to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., Chicago, contractor.

450 tons, state highway bridge, Camden county, N. J.; bids Dec. 23.

350 tons, new building, Central National Bank, Chicago, to Duffin Iron Co., Chicago.

350 tons, state bridge, Erie, Pa.; bids Dec. 19.

335 tons, including 235 tons of bearing piles, state bridge, Daulphin county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, building, Henry Valve Co., Chicago, to Reuter Bros. Iron Works Co., Chicago.

245 tons, state bridge, Lancaster county, Pa., through J. Richard Nissley, Landesville, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

240 tons, store building, Goldblatt Bros. Inc., Elmwood Park, Ill., to Calumet Iron & Supply Co., East Chicago, Ind.

220 tons, state highway bridge, Secaucus, N. J., through George Brewster, general contractor, to American Bridge Co., Pittsburgh.

211 tons, bridge, Sec. 58F and 58V-P, Warrenville, Ill., for State Highway Division, to Midland Structural Steel Co., Cicero, Ill., for fabrication by Allied Structural Steel Co.

208 tons, bridge, No. S 35-3, Thayer county, Nebr., for State Highway Department, to Omaha Steel Works, Omaha.

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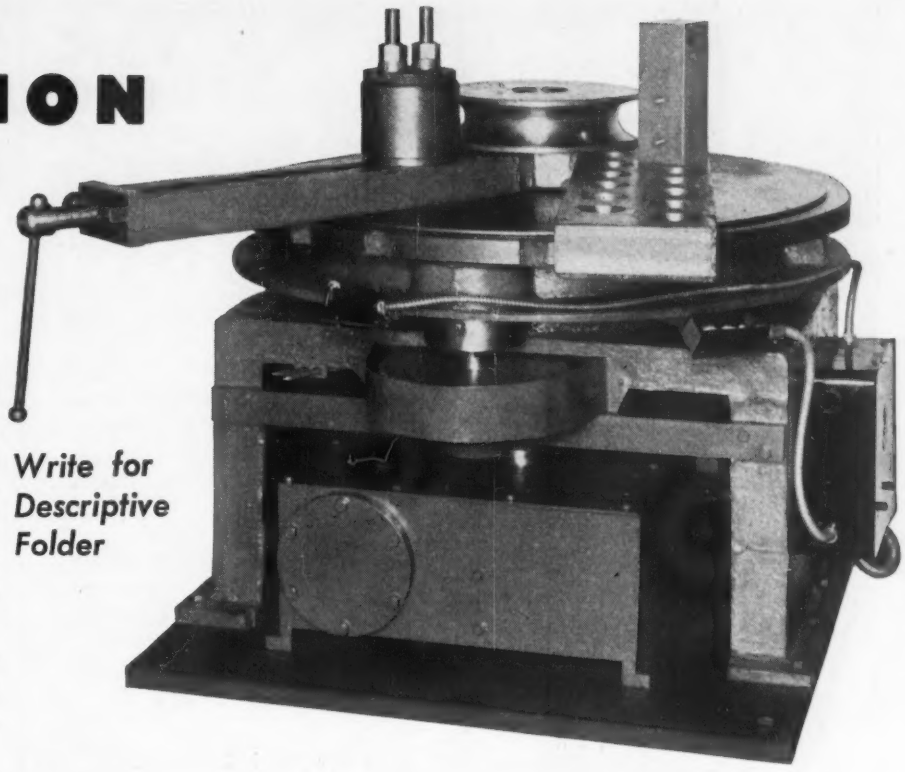
for

Pipe and Concrete Reinforcing Bars

When a production bender is used for bending reinforcing bars, a high and variable speed is very much to be desired. A four speed transmission enables this machine to bend large bars at slow speed and smaller bars at high speed, and the Pedrick feature of multiple production makes this machine a very useful addition to the contractor's equipment. The machine will make bends to any curvature up to 180° automatically without manual attention other than to load and unload the machine.



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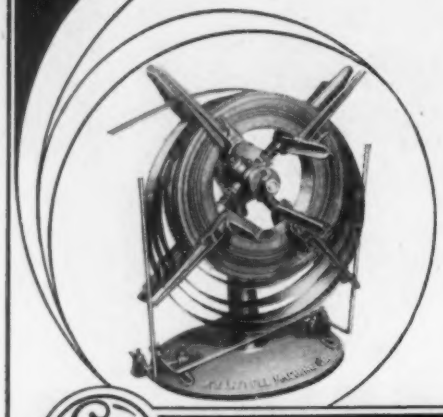
Request Bulletins



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Any Metal · Any Perforation
INDUSTRIAL and ORNAMENTAL

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165 tons, bridge, No. S 370-3, Ord county, Nebr., for State Highway Department, to Omaha Steel Works, Omaha.

147 tons, bridge, FAP 020-3-11, Brown county, Wis., for State Highway Department, to Bethlehem Steel Co., Bethlehem, Pa.; J. C. Basten, contractor.

140 tons, machine shop, Texas Co., Lockport, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

101 tons, bridge, S-0749-1, Manitowoc county, Wis., for State Highway Department, to Bethlehem Steel Co., Bethlehem, Pa.; Waterways Engineering Co., contractor.

100 tons, building, United Benefit Cafe, Omaha, to Gate City Iron Works, Omaha; Peter Kiewit Sons Co., Omaha, contractor.

100 tons, two commercial buildings, Seattle, to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

6600 tons, veterans' hospital, near Newark, N. J., bids opened Dec. 9, through the office of the United States Engineers, New York.

4900 tons, Chesapeake and Delaware canal bridge, Chesapeake City, Md.; bids Jan. 20 to U. S. Army Engineer, Philadelphia.

2000 tons, board plant, United States Gypsum Co., Alta Vista, Va.

1192 tons, water softening plant, Des Moines, Iowa, for city; A. H. Neumann & Bro., Des Moines, Iowa, low on general contract; bids Dec. 2.

850 tons, foundations, Delaware memorial bridge, near Wilmington, Del.; bids Dec. 17 to Delaware State Highway Department, Wilmington; also 1725 tons, reinforcing bars. Project to require 51,650 tons, miscellaneous steel.

600 tons, addition to Statler building, Buffalo, bids closed.

600 tons, building, Jensen Printing Co., Minneapolis; James Leck Co., Minneapolis, contractor.

500 tons, bridge, Arlington, Va.; bids to division engineer, Public Roads Administration, Washington, Jan. 14.

318 tons, sheet piling, U. S. Engineer, Milwaukee; bids Dec. 9.

300 tons, sheet piling, U. S. Engineer, Duluth; bids Dec. 4.

206 tons, bridge, Cont. 2884, West Terre Haute, Ind., for State Highway Division; Robert H. King, low; bids Nov. 25.

175 tons, foods building, Penn State; bids Dec. 17.

118 tons, addition, St. Constantine Church, Chicago; bids Dec. 5.

105 tons, foundation work, city bridge, Penrose Ave., Philadelphia; also 560 tons, reinforcing steel. Project to require approximately 18,000 tons. General contract to Foley Bros.

Unstated, addition, Healthwin Hospital, South Bend, Ind.; bids Dec. 16.

REINFORCING BARS . . .

REINFORCING BARS PLACED

300 tons, Jane Addams junior high school, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

250 tons, addition to St. Regis pulp plant, Tacoma, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; H. S. Wright, Seattle, general contractor.

250 tons, Arts building, University of Washington, Seattle, to Northwest Steel Rolling Mills, Seattle; Henrik Vallee, Seattle, general contractor.

250 tons, reinforcing bars, plant addition, Seaboard Container Co., Bristol, Pa., through McCloskey & Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, state highway projects, to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

1000 tons, veterans hospital, Ft. Wayne, Ind., for U. S. Veterans Administration; bids Dec. 19.

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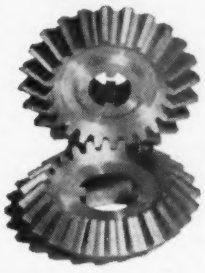

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WORM GEARS—Made from 1″ to 100″ in diam. and from 24 DP to 1 DP.

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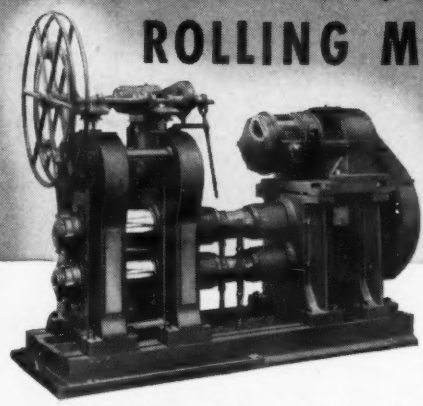

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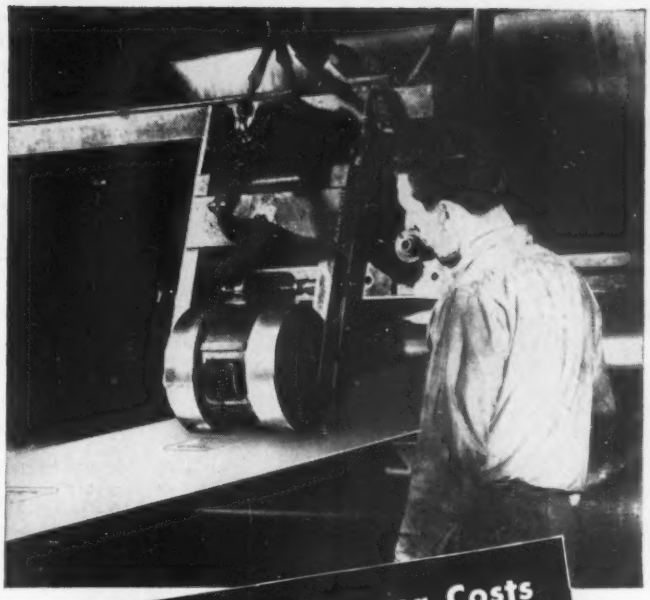

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BRANCH PLANTS
NEW YORK, BOSTON, CHICAGO, PHILADELPHIA, NEWARK, SYRACUSE
District Sales Offices: Cleveland, Cincinnati, Birmingham, Dallas

900 tons, veterans hospital, Iron Mountain, Mich., for U. S. Veterans Administration.

275 tons, Williamsport flood protection project, unit three pumping station; bids U. S. Engineer, Baltimore, Jan. 6.

120 tons, Owyhee reclamation project; bids to Bureau of Reclamation, Nyssa, Oreg., Dec. 19.

Unstated, addition to Columbia Paper Mills plant, Vancouver, Wash.; Austin Co., general contractor.

Unstated, school stadium, Renton, Wash.; Wick & Dahlgren, Seattle, low, $298,562.

PIPE . . .

CAST IRON PIPE PENDING

600 tons, assorted sizes, for city of Seattle, bids Dec. 18.

Unstated, 6,000 feet 12 to 8 inch Class 150, also 15,000 feet two inch water pipe; bids to J. E. Law, city clerk, Port Angeles, Wash., Dec. 24.

STEEL PIPE PENDING

277 tons, standard steel pipe, including 10,000 feet 1½-inch, 50,000 feet 2-inch, 40,000 feet 2½-inch, 6250 feet 4-inch and 3100 feet 5-inch, Bureau of Electricity, Department of Streets and Electricity, Chicago; bids Dec. 19.

RAILS, CARS . . .

RAILROAD CARS PLACED

Northern Pacific, 500 box cars and 200 flat cars, to its shops at Brainerd, Minn.

Wabash, 118 gondolas and 20 cabooses, to its Decatur, Ill., shops.

RAILROAD CARS PENDING

Carbon County Railway, 300 seventy-ton hopper cars, bids asked.

Elgin, Joliet & Eastern, 300 fifty-ton coke cars, bids asked.

Nashville, Chattanooga & St. Louis, 50 seventy-ton gondola cars, pending.

Southern Pacific, 9830 freight cars, bids asked; list includes 3400 gondolas, 3350 box cars, 2650 flat cars, 350 seventy-ton covered hopper cars and 80 steel caboose cars.

Wabash, 100 box cars, 50 gondolas and 50 merchandise cars, pending.

LOCOMOTIVES PLACED

Baltimore & Ohio, twenty 1500-horsepower diesel-electric freight locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Canadian National, two 3-unit 4500-horsepower diesel-electric road locomotives to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Chesapeake & Ohio, 45 locomotives; 30 switching locomotives, to Bethlehem Locomotive Works, Eddystone, Pa., and 15 heavy-duty Mallet locomotives, to Lima Hamilton Corp., Lima, O.

Chicago Northwestern, 22 diesel-electric locomotives, including fifteen 1500-horsepower freight units, six 2000-horsepower passenger units and one 1500-horsepower switcher. The first two types will be built by the Electro-Motive Division, General Motors Corp., La Grange, Ill., and the last by the American Locomotive Co., New York.

Kansas City Southern, ten 1000-horsepower diesel-electric switch engines, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Louisiana & Arkansas, one 2000-horsepower diesel-electric freight locomotive, to Fairbanks, Morse & Co., Chicago.

Northern Pacific, five diesel-electric locomotives, three 1500-horsepower road-switch locomotives going to Baldwin Locomotive Works, Eddystone, Pa., and two 6000-horsepower freight locomotives to Electro-Motive Division, General Motors Corp., La Grange, Ill.

LOCOMOTIVES PENDING

Wabash, seven 1000-horsepower and three 660-horsepower diesel-electric switch engines, pending.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BAKERSFIELD, CALIF. — Royal Tallow & Soap Co., 1260 Davidson St., San Francisco, plans to build a $500,000 plant. Architect is Philip D. Tomasello, 605 Washington St., San Francisco.

MONTEBELLO, CALIF.—Airfan Engineering Co., 833 S. San Pedro St., Los Angeles, plans to build a $250,000 factory on Telegraph Rd.

LOUISIANA

SHREVEPORT, LA.—Texas & Pacific Railroad, R. J. Gammie, chief engineer, Dallas, Tex., will reconstruct its car repair shops at a cost of $750,000.

MARYLAND

BALTIMORE—Eastern Iron & Steel Co. is erecting a 7000-sq ft addition to its plant at 6301 Erdman Ave.

BALTIMORE—General Motors Corp., 600 S. Caroline St., will erect a 1-story building at Key Highway and Battery Ave. which will be occupied by Sterrett Operating Service, a subsidiary.

BALTIMORE—Dykman Mfg. Co. has purchased equipment of Barcus Engineering Co. Inc., 3931 Falls Rd., where it will continue to manufacture a patented shaft coupling of the flexible gear type.

NORTH CAROLINA

CHARLOTTE, N. C.—Baker Equipment Engineering Co., Joseph B. Baker, president, Summit Ave. and Norfolk St., plans to build a $90,000 plant. Architects are Riberstein & Knowles, 1600 Elizabeth Ave.

CHARLOTTE, N. C. — Refractories Co. of North Carolina Inc. has been incorporated with a capital of $100,000 by D. A. Howell to deal in fire resistant plastics and refractories.

TEXAS

AMARILLO, TEX. — Southwestern Public Service Co. plans an electric power plant expansion costing $3,500,000.

AUSTIN, TEX.—Capital Prefabricators Inc., Nalle Bldg., will build a $250,000 prefabrication housing plant and warehouse.

AUSTIN, TEX.—American Light & Traction Co., 105 W. Adams St., Chicago, plans construction of a pipe line from the Austin field as a new source of natural gas to consumers in Detroit, western Michigan and Wisconsin. Cost will be $104 million.

BORGER, TEX.—Alamo Refinery Co. plans to build a $75,000 acid refinery plant.

BROWNSVILLE, TEX.—Rio Grande Valley Gas Co. will spend $110,000 on additional gas plant expansions and improvements.

BRYAN, TEX.—Sinclair Refining Co., Gulf Bldg., Houston, will build a $200,000 petroleum products terminal station.

BRYAN, TEX.—Union Fork & Hoe Co., Walter A. Irwin, vice president, 500 Dublin Ave., Columbus, O., plans to build a $100,000 plant here.

DALLAS, TEX.—Dallas Light & Power Co. will build a 6000 kw generating unit at a cost of $1,115,000; and a 60,000 volt transformer station costing $628,000.

DALLAS, TEX.—Ford Motor Co., Grand Ave., is converting and expanding its auto assembly plant at a cost of $1 million. Engineer is Bill Schumacher, c/o owner.

DALLAS, TEX.—National Industries Corp., c/o Joe B. Salmon Jr., Republic Bank Bldg., has awarded a $525,000 contract to O'Rourke Construction Co., 1001 W. Commerce St., for erection of a warehouse.

DALLAS, TEX.—Massey-Harris Co., 615 S. Marquette St., Racine, Wis., plans to build a $400,000 warehouse and office here.

HOUSTON, TEX.—Banks Moreland Co. and Graver Construction Co., both divisions of Graver Tank & Mfg. Co., East Chicago, Ill., have begun work on a $350,000 expansion program including warehouses, fabricating shops and other facilities on a 5-acre site on McCormick Ave. and Houston Belt & Terminal Railway.

HOUSTON, TEX.—F. H. Maloney Co. has awarded a contract to Marxen & Son for construction of a $125,000 office building and plastics plant.

LONGVIEW, TEX.—Southwestern Gas & Electric Co., Frank M. Eilkes, president, 428 Travis St., Shreveport, La., will build a 150,000 kw power plant at a cost of $10,500,000.

WACO, TEX.—Southwestern Electric Service plans a $3 million power plant expansion.

WEST VIRGINIA

CEREDO, W. VA.—Truax-Traer Co., Chicago, J. M. McCoy, supervising engineer, is building a $3 million coal washing and processing plant here to handle 10,000 tons of coal daily. Contracting engineer is McNally-Pittsburg Engineering Co., Pittsburg, Kans.

WISCONSIN

GREENFIELD, WIS.—Hotpoint Inc., 4855 W. McGeoch Ave., Milwaukee, has awarded a $750,000 contract to Austin Co., 510 Dearborn St., Chicago, for the design and construction of plant additions and alterations.

MADISON, WIS.—Coan Mfg. Co. is constructing an addition to its plant at 2070 Helena St. and also contemplates future additional expansion.

MILWAUKEE—George Seelman & Sons Co., 1127 N. Seventh St., has awarded a contract to W. W. Oeflein Inc., 5345 N. Hopkins St., for a $135,000 factory addition.

CANADA

HAMILTON, ONT.—International Harvester Co. of Canada Ltd., Sherman Ave. N., will build a $125,000 plant and foundry. Architect is J. D. Kyles, 1104 Pigott Bldg.

HAMILTON, ONT.—International Harvester Co. of Canada, Ltd., Sherman Ave., has awarded an $85,000 contract to W. H. Cooper Construction Co. Ltd., Medical Arts Bldg., for the erection of plant additions and the foundation for a foundry.

PORT STANLEY, ONT.—Dominion Natural Gas Co. Ltd., L. D. Burdick, 454 Talbot St., St. Thomas, will build a $2 million pipeline and gas storage project. Engineer is F. A. Bell, St. Thomas.

VIRGINIATOWN, ONT.—Kerr Addison Gold Mines Ltd., 80 King St., Toronto, will build a $100,000 mill addition.

GATINEAU MILLS, QUE.—Commercial Alcohol Ltd., 3176 Notre Dame St., East Montreal, has awarded a $2,500,000 contract to Vincent Construction Co. Inc., 4527 St. Denis St., Montreal, for construction of a plant.

MALARTIC, QUE.—Canadian Malartic Gold Mines Ltd., 25 W. King St., Toronto, will build a $150,000 mill addition. Engineer is E. V. Neelands, 25 W. King St., Toronto.

MONTREAL, QUE.—Canadian National Railways, E. R. Eogle, chief engineer, central region, Union Station, Toronto, Ont., has awarded a $75,000 contract to Deacon & Stewart Ltd., 1440 St. Catherine St. W., for construction of engine house additions and alterations.

QUEBEC CITY, QUE.—Antonio Bureau, 40 du Capucins St., will build a $100,000 ornamental iron work plant.

QUEBEC CITY, QUE.—International Harvester Co. of Canada Ltd., 371 St. Paul St., will build a $500,000 plant between St. Vallier and Verdun Sts.

VAL D'OR, QUE.—Chimo Gold Mines Ltd., 24 King St., Toronto, plans a shaft sinking project costing $100,000. Engineer is J. P. Norris, c/o owner.

PUERTO RICO

PIO PIEDRAS, P. R.—Puerto Rico Industrial Development Co., San Juan, will build a $150,000 metal products plant.

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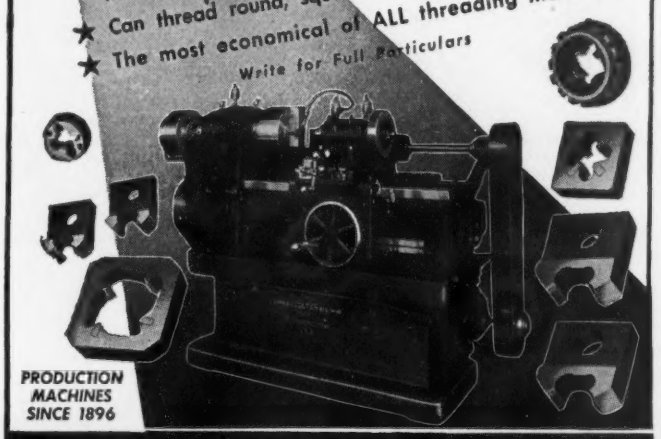

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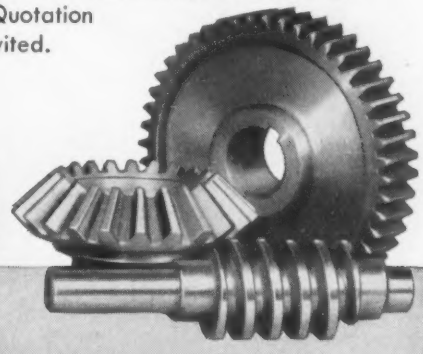

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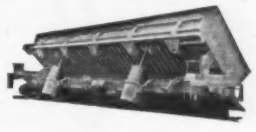

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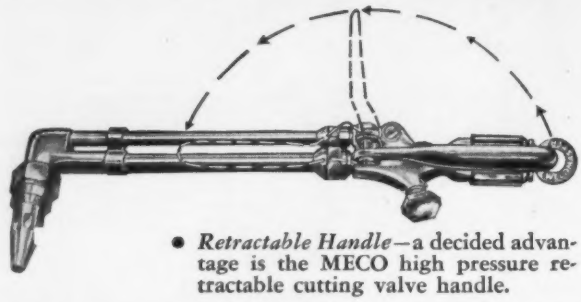

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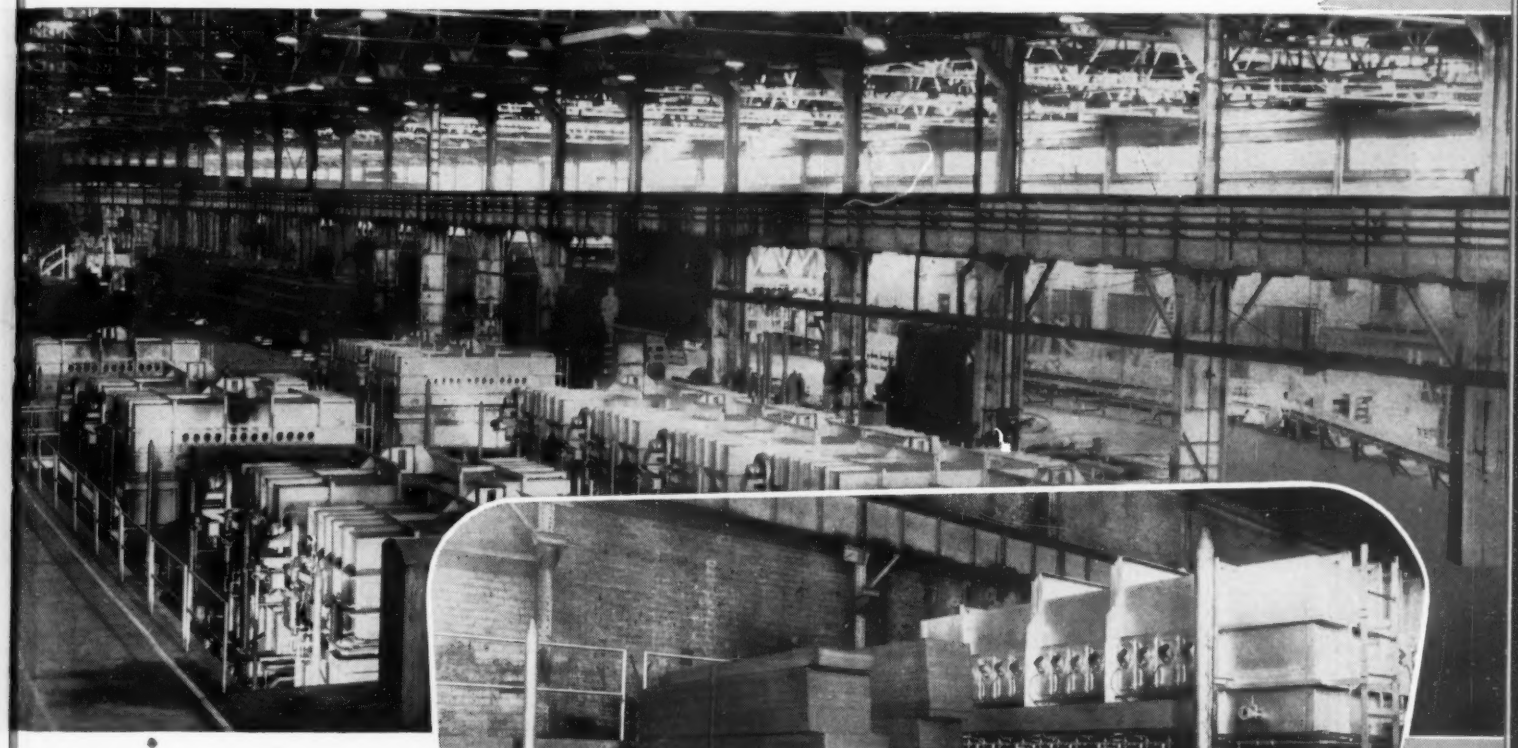
Classified Advertising Pages 173, 174, 175

THESE 12 WILSON Bell Type Furnaces are used for spheroidizing the carbon steel sheets for cold formed spring steel bumpers at this new plant of the Standard Steel Spring Company at Newton Falls, Ohio.

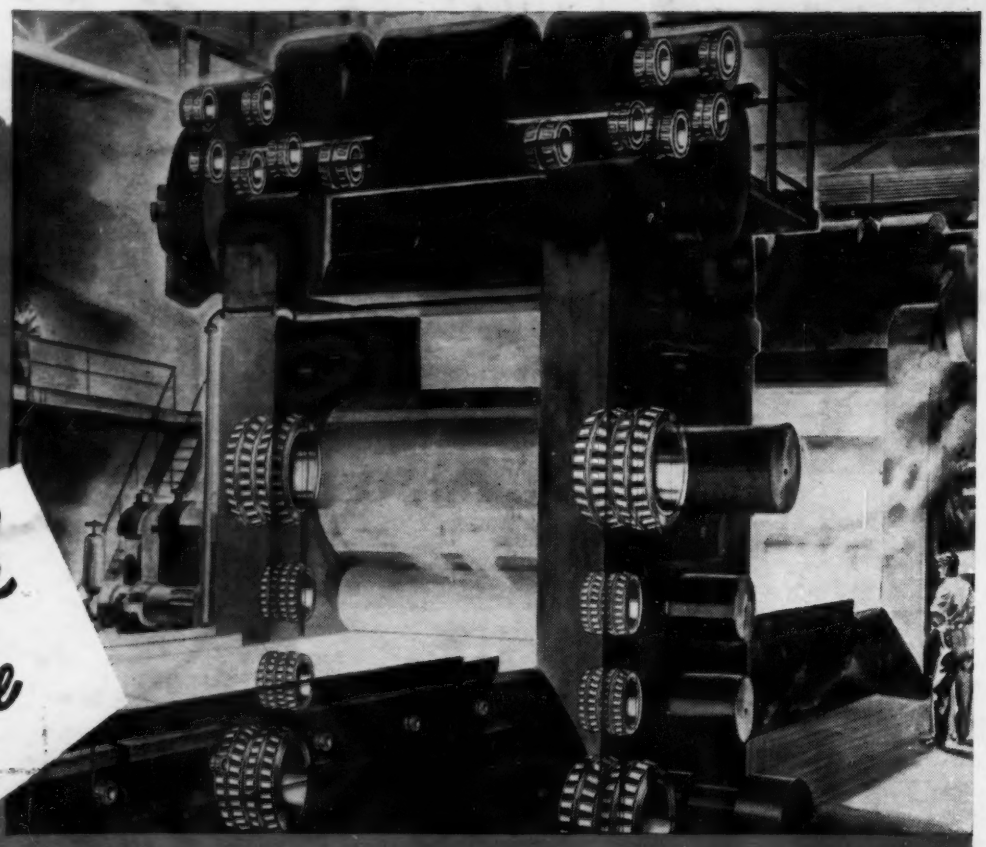


INDUSTRIAL FURNACES
RADIANT TUBE HEATING
HEAT TREATING PROCESSES

ENGINEERED AND CONSTRUCTED BY THE

Lee Wilson ENGINEERING CO., INC.

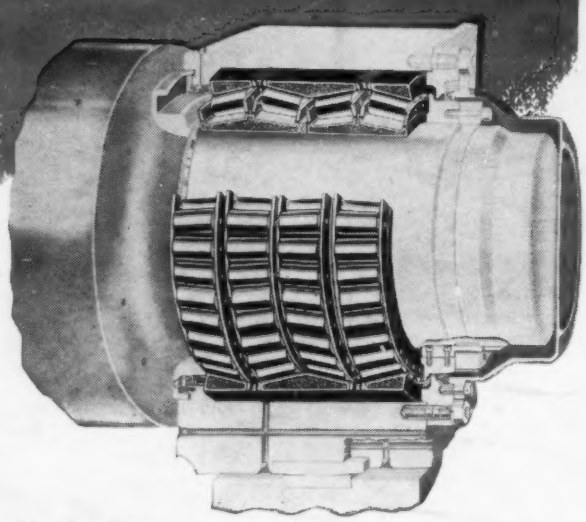
20005 West Lake Road • CLEVELAND, OHIO



Let's look into the

Current Rolling Mill Bearing Situation

Now, through *balanced proportion* design, the Timken Roll Neck Bearing makes possible 50% to 60% greater roll neck strength with correspondingly reduced roll neck stress and deflection, thereby assuring greater mill and bearing rigidity and producing still higher rolling precision.



To sum up the current roll neck bearing situation, there is now no need for you to deny yourself the advantages and economies of roller bearings in your rolling equipment; no need for complicated and expensive lubricating systems; no need for making routine roll changes more difficult and time-consuming.

For specific information covering the application of Timken Balanced Proportion Roll Neck Bearings in new or existing mills — any type, hot or cold — consult the mill builder or our engineers. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROLL NECK BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION